

BRITISH LIGHT CRUISERS 1939–45

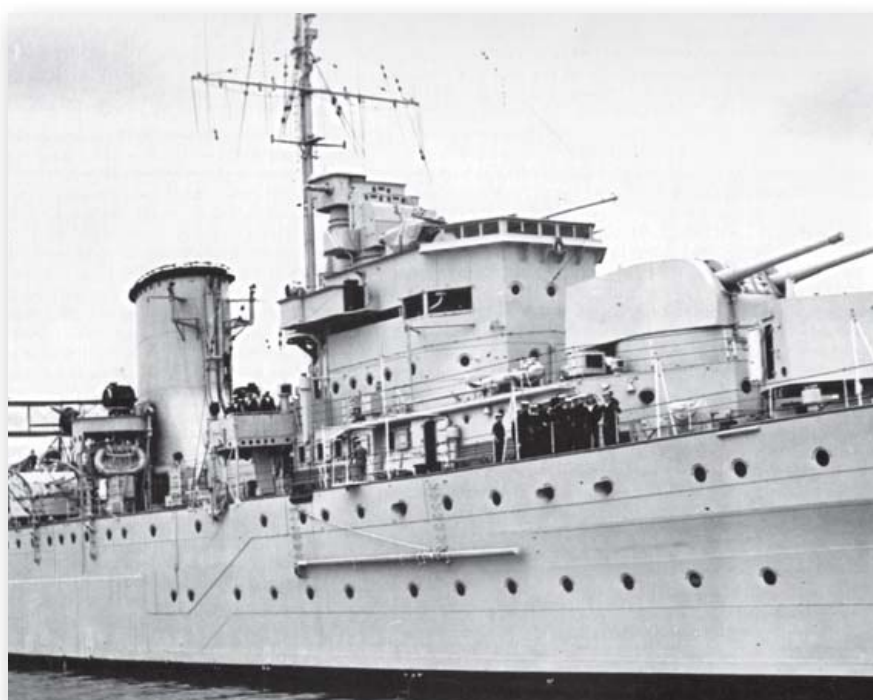


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ILLUSTRATED BY PAUL WRIGHT

NEW VANGUARD 194

BRITISH LIGHT CRUISERS 1939-45



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CONTENTS

INTRODUCTION	4
DESIGN AND DEVELOPMENT	5
• The World War I Cruisers	
• The London Naval Treaty	
• Leander Class	
• Arethusa Class	
• Southampton Class	
• Edinburgh Class	
• Dido Class	
• Bellona Class	
• Fiji Class	
• Swiftsure Class	
OPERATION	34
• Weaponry	
• Sensors and Fire Control	
SPECIFICATIONS	41
• Caledon Class	
• Ceres and Carlisle Classes	
• D Class	
• E Class	
• Leander Class	
• Arethusa Class	
• Southampton Class	
• Edinburgh Class	
• Dido Class	
• Fiji Class	
• Bellona Class	
• Swiftsure Class	
FURTHER READING	47
INDEX	48

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INTRODUCTION

It is frequently claimed that military or naval forces were often designed for the previous war rather than the one in which they are currently engaged. However, this is not really true of the Royal Navy during the period between the two world wars, although the Admiralty was certainly slow to recognize the growing threat posed by aircraft and U-Boats. A far more serious handicap than old-fashioned thinking was the limitations imposed on the Admiralty by diplomacy and economics. The Washington Naval Treaty (1922) which set limits on national navies' size and tonnage in an attempt to avoid future conflicts, led to a concentration on building heavy (8-inch gun) cruisers throughout the decade. Then in 1929 came the Wall Street Crash and the onset of an international recession.

In order for governments to save money a new treaty was negotiated at the London Naval Conference of 1930, and as a result Britain switched from building heavy, 8-inch gun cruisers to smaller and cheaper 6-inch gun ones. These were soon labelled light cruisers. Britain was still constrained by budget and treaty obligations, so the first classes of these were small and lightly armed. However, during the years immediately before the outbreak of World War II, the first of a new series of light cruisers were commissioned which were as powerful as they were fast and sleek. With the wartime additions of radar and fire control systems, these and the cruisers that followed them would be amongst the best warships of their kind in the world.

During World War II, these light cruisers proved their worth in every naval theatre – in the Arctic, the Atlantic, the Mediterranean, the Indian Ocean and the Pacific. However, it was the gruelling challenge posed by the naval war in the Mediterranean and in operations in support of the Arctic convoys that proved the greatest test for these warships. Despite losses and damage caused

by surface ships, U-Boats and enemy aircraft, these versatile warships and their hard-pressed crews proved their worth in action, and played a major part in securing victory in both of these key theatres. This is the story of these important British warships and of the men who served in them.

In this book we shall look at their development and design, at their armament and the way they fought. However, unlike

HMS *Leander*, pictured two years before the outbreak of the war, with her new twin-mounted 4-inch AA guns visible, as well as her newly fitted Supermarine Walrus seaplane. When war broke out only *Achilles* was still fitted with her original single 4-inch mounts.



previous titles such as *British Heavy Cruisers*, with 65 warships to deal with, lack of space prevents giving more than a summary of the operational history for each of these vessels. However, this allows us to delve a little deeper into other areas, such as gunnery and performance. A book of this size can never be more than a useful summary of the subject, but we hope it captures the nature and abilities of these warships which for six long years remained at the forefront of Britain's naval war.

DESIGN AND DEVELOPMENT

During World War I Britain was able to deploy the largest cruiser fleet in the world. These 86 warships were divided by type and role, but essentially they fell into two main categories – those designed to protect trade routes, and those that operated in support of the Grand Fleet. While there was some degree of crossover between these two roles, the division remained in place until the early 1930s. Armoured cruisers were a category in their own right, built to a flawed design that evolved into the battlecruiser. The faults of these two warship types were exposed at the battle of Jutland in 1916, and therefore represent something of a dead end in terms of warship design. A far more versatile warship was the scout cruiser (or North Sea cruiser), a ship type that eventually evolved into the British light cruiser of World War II.

During the war the British built an additional 44 cruisers, mainly small ones, designed to be used in the North Sea. The war saw no great technical advances in warship design, although oil-fired boilers gradually replaced coal-fired ones, and the growing threat of air attack led to the provision of anti-aircraft guns. The real arbiter of British cruiser design was diplomacy – the naval treaties whose constraints helped shape the world's navies during the inter-war years. As a result of the Washington Naval Treaty the emphasis shifted to the building of powerful new cruisers, designed to make the most of the treaty limit of cruisers of 10,000 tons armed with 8-inch guns.

A combination of obsolescence and post-war cuts led to the scrapping or selling of much of the Royal Navy's wartime cruiser fleet. By 1930 only 42 cruisers that were built before or during the war remained in British service, and of these seven were in the process of being decommissioned. Three more cruisers of the Hawkins class carried 7.5-inch guns, and were more akin to the large 8-inch cruisers that were entering service than the rest of the old wartime fleet. All of the remaining 6-inch gun cruisers were C, D or E class vessels, launched during or shortly after the war. While these ageing 6-inch ships had been joined by 11 new 8-inch cruisers, and more of them were being built, this cruiser fleet had to perform the same duties that a pre-war fleet of twice its size had done.

It was clear that the Royal Navy needed more cruisers, and the expense of the 8-inch cruiser programme was already placing great demands on the naval budget. The Wall Street Crash of 1929 and the resulting economic downturn and global recession meant a greatly reduced naval budget and the cancellation of the navy's long-term plans. To help the money stretch, the British government initiated a new

A close-up view of the Leander class cruiser HMS *Orion*, pictured in 1937, showing the windbreak protecting her otherwise open bridge. Her masts were replaced with tripods before the outbreak of the war to carry her new Type 279 air warning radar.



HMS *Coventry*, a Ceres class cruiser that lost her original 6-inch guns during the mid 1930s and was rearmed with ten 4-inch AA guns – one forward, six on the beam, and three aft. She was bombed and sunk off Tobruk in September 1942.



series of naval disarmament talks, which it was hoped would negate the need to match the construction of other fleets in order to maintain the naval status quo. However, while the diplomats played their part, the Royal Navy would have to make the most of its existing cruiser fleet.

The World War I Cruisers

In 1930, the Royal Navy had 25 C class cruisers, divided into six sub-classes: Caroline, Calliope, Centaur, Caledon, Ceres, and Carlisle. Of these, all but one of the four remaining warships of the Caroline class were earmarked for disposal, and the final ship would follow her sisters to the breakers’ yard in 1934. Similarly the eight surviving cruisers of the Calliope class and Centaur class would also be disposed of during the early 1930s as more modern 6-inch cruisers joined the fleet. They represented the oldest groups of C class cruisers, launched before 1916. The remaining three sub-classes – 13 cruisers in total – were larger and better armed, and so they were retained. So too were the eight larger D class cruisers, as well as the two E class cruisers that had been launched in 1919 and 1920.

The oldest of these surviving C class sub-classes was known as the Caledon class, and consisted of three ships – *Caledon*, *Calypso* and *Caradoc*. Laid down before the battle of Jutland, they were designed for service in the North Sea. They were essentially a repeat of the earlier Centaur class, but were a little larger, carried anti-aircraft (AA) guns, and boasted a better propulsion system than their predecessors. As they spent much of the 1930s in reserve these cruisers weren’t modified before 1939. After the war began, *Caradoc* received additional light AA guns and radar, and *Calypso* was sunk before she could be modified. Only *Caledon* was extensively modified when in 1943 she was converted into an anti-aircraft cruiser, and her guns and torpedo tubes were replaced by 4-inch AA guns and light AA weapons, augmented by radar.

Vessel	Builder	Laid Down	Launched	Commissioned	Notes
Caledon	Cammell Laird, Birkenhead	March 1916	November 1916	February 1917	Converted to AA cruiser 1943. Broken up 1948
Calypso	Hawthorn Leslie, Clydeside	February 1916	January 1917	August 1917	Sunk 12 June 1940
Caradoc	Scotts, Clydeside	February 1916	December 1916	June 1917	Broken up 1946

The five cruisers of the Ceres class (*Ceres*, *Cardiff*, *Coventry*, *Curacoa* and *Curlew*) were originally designed as repeats of the Caledon class, but modifications introduced in the wake of Jutland resulted in these ships being given a sub-class all of their own. Unlike the previous ships, there were two

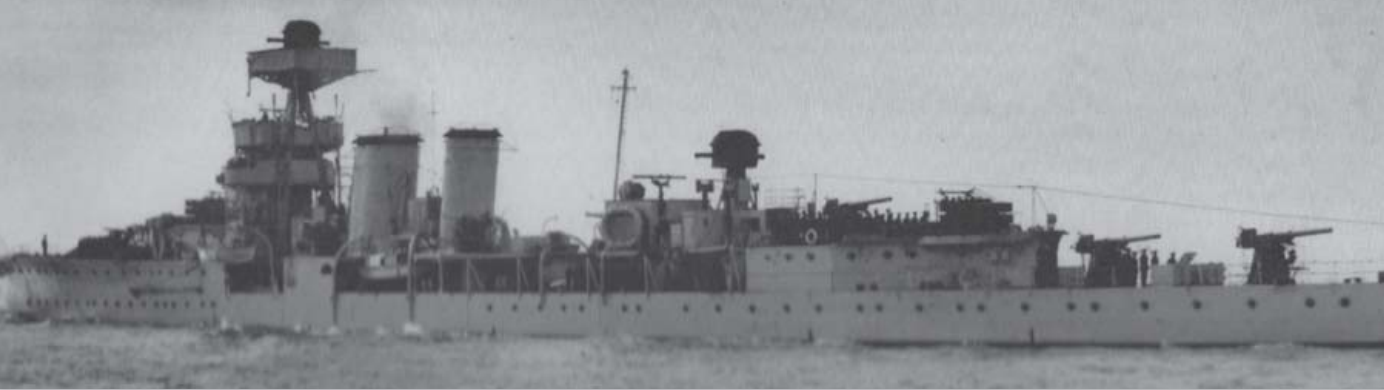


The original two C class AA cruiser conversions proved so successful and useful that the Caledon class vessel *Caledon* and *Columbo* of the Carlisle class were also converted into anti-aircraft vessels in 1942–43. This is HMS *Caledon*, photographed in February 1944 during her post refit work-ups in Scapa Flow.

turrets forward of the bridge, which was moved aft to accommodate ‘B’ turret, mounted on top of a small shelter deck. To compensate for this added top-weight the beam was increased slightly, which led to a somewhat greater displacement. In 1934 plans were made to convert these vessels into AA cruisers, and between 1935 and 1936 *Coventry* and *Curlew* had their main armament of five 6-inch guns replaced by ten 4-inch AA guns, controlled by a HACS (High Angle Control System) – the Royal Navy’s visual AA fire control system. *Curacoa* was similarly converted in 1939, but she received eight 4-inch guns, in four twin mounts. The remaining two ships of the class were never converted, and retained their battery of five 6-inch guns throughout the war. *Curlew* was sunk in 1940 before any further modifications could be made, but the remaining four ships of the class received additional light AA guns and radar as the war progressed, or in the case of *Coventry* and *Curacoa* until their loss during the autumn of 1942.

Vessel	Builder	Laid Down	Launched	Commissioned	Notes
<i>Ceres</i>	John Brown, Clydeside	July 1916	March 1917	May 1917	Broken up 1946
<i>Cardiff</i>	Fairfield, Clydeside	July 1916	April 1917	June 1917	Broken up 1946
<i>Coventry</i>	Swan Hunter, Tyneside	August 1916	July 1917	February 1918	Converted to AA cruiser 1936. Sunk 14 September 1942
<i>Curacoa</i>	Pembroke Dockyard	July 1916	May 1917	February 1918	Converted to AA cruiser 1939. Sunk 2 October 1942
<i>Curlew</i>	Vickers, Tyneside	August 1916	July 1917	December 1917	Converted to AA cruiser 1936. Sunk 26 May 1940

The Carlisle class ships (*Carlisle*, *Cairo*, *Calcutta*, *Capetown* and *Colombo*) were repeats of the *Ceres* class, but due to problems with wetness – waves breaking over the bow – of the earlier models, the forecastle of the Carlisle class cruisers was raised five feet, creating a pronounced flare forward of the bridge. Otherwise these ships were identical to their predecessors. In 1938 *Cairo* and *Calcutta* were converted into anti-aircraft cruisers, followed by *Carlisle* the following year. Like the modifications made to the *Ceres* class AA cruiser *Curacoa*, this involved landing the main armament and the torpedo tubes and replacing them with eight 4-inch AA guns in four twin mounts, one mounted in the bow, one amidships, and two in the stern. A quadruple 2-pdr ‘pom-pom’ was mounted in place of ‘B’ turret immediately forward of the bridge. *Colombo* was modified into an AA cruiser in 1942, but *Capetown* was never converted, and so retained her original armament of five 6-inch guns and torpedo tubes.



HMS *Curlew*, a Ceres class AA cruiser, which was originally commissioned in 1917 and converted into a prototype anti-aircraft cruiser in 1936–37. During the war she served with the Home Fleet until she was bombed and sunk off Narvik in September 1940.

Cairo and *Calcutta* underwent virtually no wartime modifications before their loss. *Capetown*, *Colombo* and *Carlisle* received a few additional light AA guns and basic radar suites, but otherwise remained unaltered throughout the war. *Carlisle* was bombed off Alexandria in October 1943 and written off as an active warship, ending the war as an immobile base ship before being broken up in 1948.

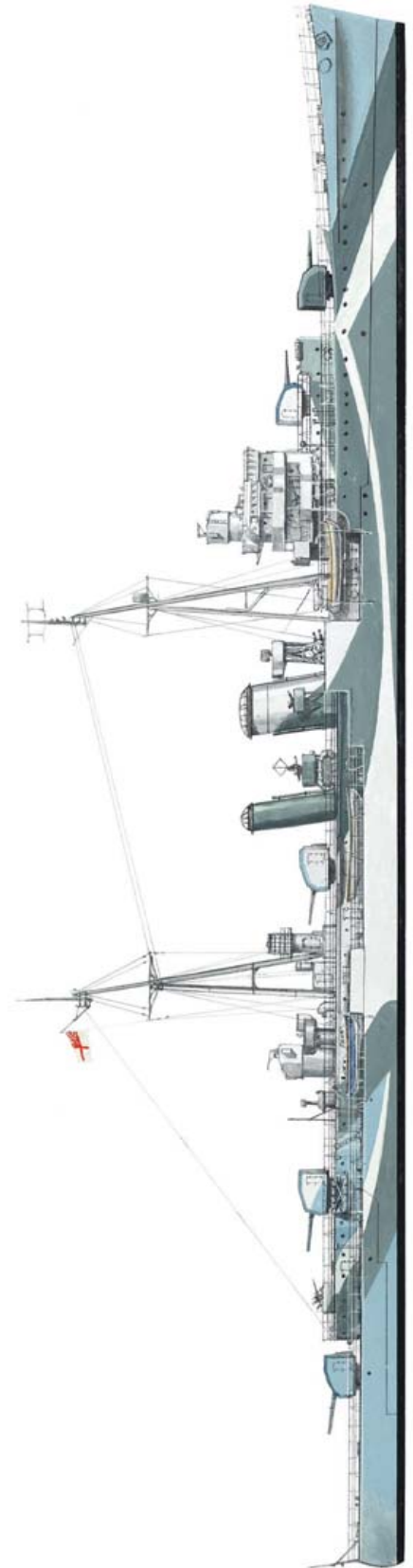
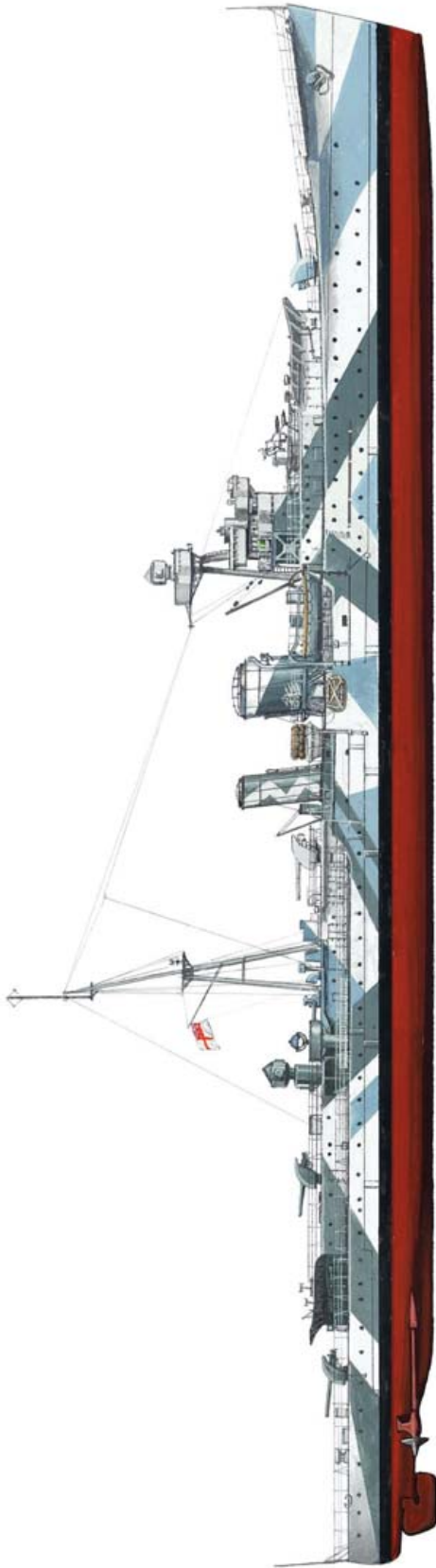
Vessel	Builder	Laid Down	Launched	Commissioned	Notes
<i>Carlisle</i>	Fairfield, Clydeside	October 1917	July 1918	November 1918	Converted to AA cruiser 1939. Written off 9 October 1943
<i>Cairo</i>	Cammell Laird, Birkenhead	November 1917	November 1918	October 1919	Converted to AA cruiser 1938. Sunk 12 August 1942
<i>Calcutta</i>	Vickers, Tyneside	October 1917	July 1918	July 1919	Converted to AA cruiser 1938. Sunk 1 June 1941
<i>Capetown</i>	Cammell Laird, Birkenhead	February 1918	June 1919	February 1922	Broken up 1948
<i>Colombo</i>	Fairfield, Clydeside	December 1917	December 1918	June 1919	Converted to AA cruiser 1942. Broken up 1948

The eight D class cruisers that entered service during the last days of World War I or during its aftermath were designed to counter the post-Jutland threat posed by the wartime German cruisers that were then nearing completion. These cruisers were larger than the British C class and would carry a larger armament. The Admiralty’s solution was to design the D class cruiser, which was larger than its C class predecessors and carried an extra 6-inch gun. Unlike the wasteful German policy of mounting broadside guns, the Admiralty favoured a centreline arrangement, allowing all the guns to fire on either beam – a policy followed in

A **HMS CALCUTTA (1939), HMS DANAE (1940)**

HMS *Calcutta* (top) was a Carlisle class anti-aircraft cruiser that was converted into its new role in 1938. At that time she was rearmed with four twin-mounted 4-inch guns, while a quadruple 2-pdr ‘pom-pom’ was mounted in place of ‘B’ turret. All of her original 6-inch guns were removed, as were her torpedo tubes. After assisting in the Dunkirk evacuation she was sent to the Eastern Mediterranean, having been repainted in this camouflage scheme before her departure. She retained this colour scheme until her loss at the hands of enemy aircraft off Crete in June 1941.

HMS *Danae* (bottom) was a D class cruiser that hunted German raiders in the South Atlantic before joining the British Malaya Force in early 1940, based in Hong Kong and Singapore. This shows her as she looked towards the end of the year, painted in a colour scheme favoured by the Royal Navy in the Far East. She took part in the subsequent evacuation of Singapore and the East Indies, and returned to Britain in the summer of 1942. By 1940 she carried five 6-inch guns in single mounts, as the mount behind her bridge had been removed in a pre-war refit to make way for her tripod foremast.





C class cruisers. This meant that the six-gun D class cruisers would be the equal of their new ten-gun German counterparts.

The design of the D class cruisers was similar to the Carlisle class, but the hulls were lengthened to accommodate the additional gun mounting, so these vessels had two 6-inch guns forward, two amidships and two in the stern. Torpedoes – a dozen in four triple launchers – were also carried amidships, two

HMS *Dauntless*, a D class cruiser, pictured off Durban in May 1942. She had recently emerged from a refit in Portsmouth, where her light AA armament was increased and new radars were fitted. She remained in the Indian Ocean until the end of the year.

launchers on each beam. Lessons learned from Jutland led to the addition of deck protection over the magazines and better gun shields. The last two D class cruisers, *Despatch* and *Diomedé*, had a more pronounced sheer on the bow than their sisters, in line with the raked bow of the Carlisle class.

These vessels received only minimal modifications. During the war *Danae* and *Delhi* had their torpedo tubes removed, and all received additional small AA guns and radars, including *Dunedin*, which was torpedoed and sunk off the coast of Brazil before any major changes to her armament could be made. The biggest modification was made to *Delhi* during a refit in the United States in 1941. Her main battery was replaced by five US-built 5-inch guns, complete with their attendant Mk 37 fire control directors and fire control radar. For the most part these D class cruisers were deployed away from the main theatres, and so never benefited from the regular upgrades available to warships operating in the Home and Mediterranean fleets.

Vessel	Builder	Laid Down	Launched	Commissioned	Notes
<i>Danae</i>	Armstrongs, Tyneside	February 1916	January 1918	July 1918	Transferred to Polish service October 1944
<i>Dauntless</i>	Palmers, Tyneside	January 1917	April 1918	November 1918	Broken up 1946
<i>Dragon</i>	Scotts, Clydeside	January 1917	December 1917	August 1918	Expended as breakwater, Normandy, July 1944
<i>Delhi</i>	Armstrongs, Tyneside	October 1917	August 1918	June 1919	Broken up 1948
<i>Dunedin</i>	Armstrongs, Tyneside	November 1917	November 1918	September 1919	Sunk 24 November 1941
<i>Durban</i>	Scotts, Clydeside	June 1918	May 1919	November 1921	Expended as breakwater, Normandy, June 1944
<i>Diomedé</i>	Vickers, Tyneside	June 1918	April 1919	February 1922	Broken up 1946
<i>Despatch</i>	Fairfield, Clydeside	July 1918	September 1919	May 1922	Broken up 1946

Apart from the Hawkins class of heavier cruisers with their 7.5-inch guns, the only other World War I-era cruisers to remain in service until the outbreak of World War II were the two E class vessels, *Emerald* and *Enterprise*. Like

the D class, they were constructed in response to the new breed of German cruiser being built towards the end of World War I, and were essentially larger and more powerful versions of that previous class. They carried seven 6-inch guns, two forward, three amidships (two of which were in broadside mounts) and two aft. This meant they had a similar broadside to D class vessels despite the extra gun and an extra 3,400 tons of displacement. However, they had a longer cruising range, and like the more powerful Hawkins class they represented a break from the tradition of building small cruisers designed for operations in the North Sea. These larger vessels were earmarked for commerce protection and defending the sea lanes rather than for operations in support of the main fleet.

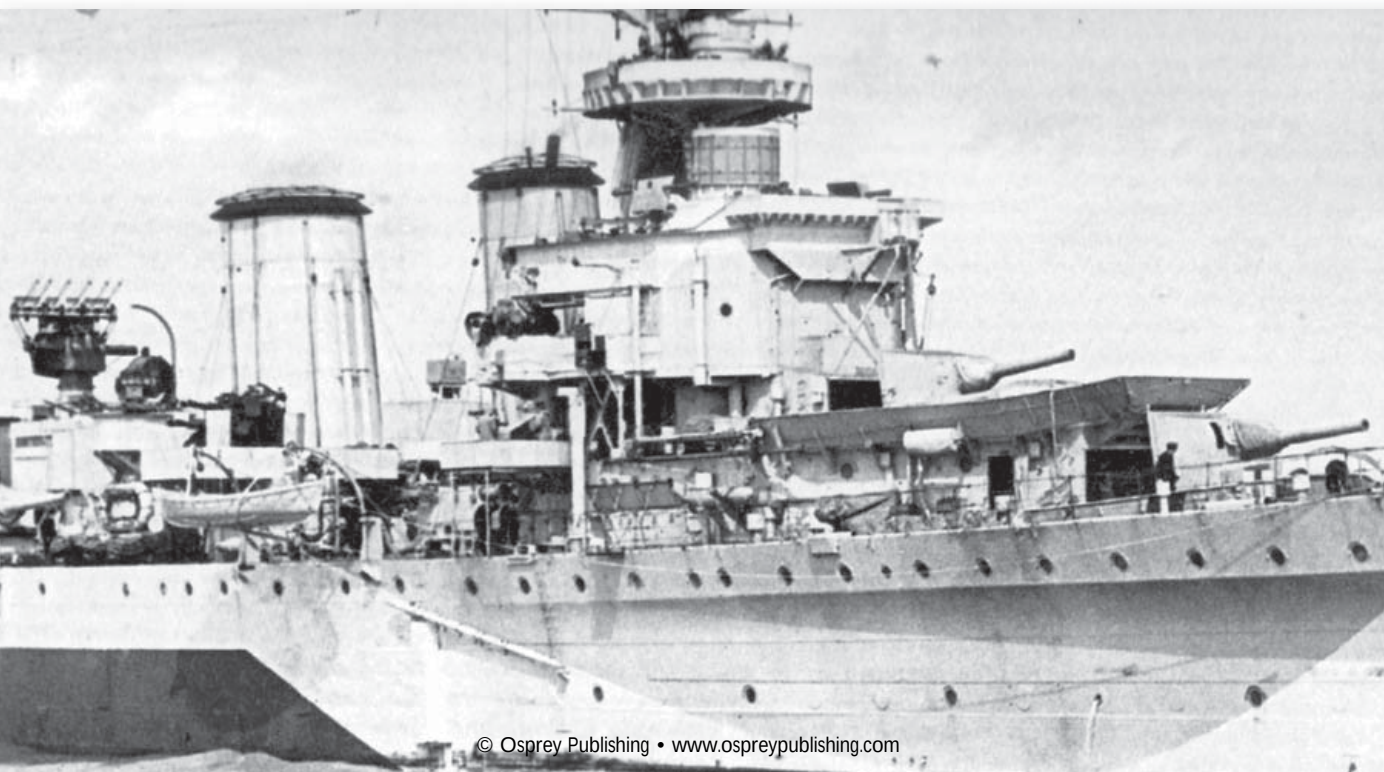
During the 1930s both cruisers were fitted with a catapult and a HACS director for their suite of three 4-inch AA guns. *Enterprise* was also used as a trials ship for the new twin 6-inch turret, and it proved so successful that this turret remained in place as the cruiser's 'A' turret. During the war both *Emerald* and *Enterprise* received a comprehensive radar suite and additional light AA armament. Finally, in 1944 both vessels had their catapults removed and so lost their American-built Kingfisher seaplanes.

Vessel	Builder	Laid Down	Launched	Commissioned	Notes
<i>Emerald</i>	Armstrongs, Tyneside	September 1918	May 1920	January 1926	Broken up 1948
<i>Enterprise</i>	John Brown, Clydebank	June 1918	December 1919	April 1926	Broken up 1946

A detailed view of the forward superstructure of HMS *Emerald*, which together with her sister ship *Enterprise* was classified as an E class cruiser. This photograph was taken in Scapa Flow in the spring of 1943 after she emerged from an extensive modernization and refit in Portsmouth. This picture provides a good view of her Type 285 AA fire control radar, seen behind the after funnel.

The London Naval Treaty

By 1930, most of these 6-inch cruisers were over ten years old, and warship design had moved on. The latest Japanese and French 6-inch cruisers carried their guns in twin turrets, a style advocated by British naval designers but not yet adopted by the Admiralty. Strangely, what forced them to embrace these more modern designs was the impact of the global recession in the early 1930s.



Like other naval powers, the British wanted to reduce their naval budget in line with other Treasury cuts, and the safest way to achieve this was to encourage other naval powers to reduce their budgets too.

This international need for parsimony led to the London Naval Conference, which was held from January to April 1930. Britain, the United States, France, Italy and Japan all participated in these talks, and a treaty was finally signed in late October. Under its terms the building limits imposed by the Washington Naval Treaty were extended, which limited warship size, and the signatories agreed not to build any more capital ships for five years. The London Treaty divided cruisers into two types – those with guns of 6.1 inches or more, and those fitted with smaller weapons. While the number of ‘heavy cruisers’ was limited, there was no cap on the number of ‘light cruisers’. These terms weren’t used in the treaty, but they would creep into naval parlance during the early 1930s. The treaty marked the official division of cruisers into these two categories.

According to the treaty, cruisers of any type couldn’t exceed a displacement of 10,000 tons, and with a cap on the heavy cruiser fleet of 15 ships totalling 147,000 tons, the Admiralty recognized that it had already reached its treaty limit. In fact, to make way for the new 8-inch cruisers *York* and *Exeter* which were nearing completion, the navy would have to place one of its older Hawkins class cruisers in reserve. Although there was no ship limit for light cruisers, the treaty set a cap on tonnage of 192,200 tons. This meant that *Exeter* would be the navy’s last heavy cruiser. From this point on, the future of British cruiser design would revolve around the 6-inch gun.

Leander Class

Even before the treaty was signed, the Admiralty had commissioned the building of the first of these 6-inch cruisers. Plans for these vessels were already in place, as the Admiralty had requested designs to be drawn up for 5.5-inch or 6-inch gun cruisers, based on the hull design of the 8-inch cruiser *York*. The smaller calibre gun was soon abandoned and twin turrets were adopted, following a successful trial of this new turret configuration on board HMS *Enterprise*. These 6,400 ton cruisers would carry four of these new twin turrets, which were designed for high-angle anti-aircraft fire as well as for surface gunnery.

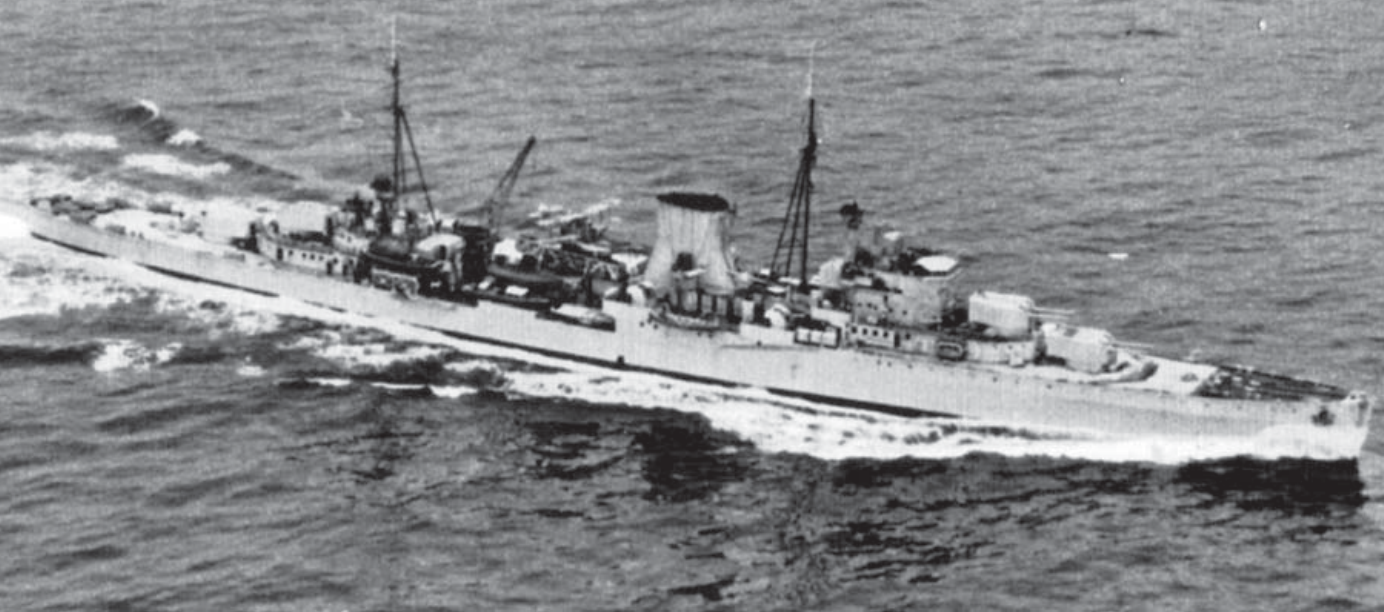
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HMS AJAX AT THE BATTLE OF THE RIVER PLATE, 1939

On 13 December 1939 the German pocket battleship *Graf Spee* was sighted approaching the estuary of the River Plate, off the South American coast of Argentina and Uruguay. Waiting for her there was Force G (the South American Cruiser Squadron), which consisted of the heavy cruiser *Exeter* and the Leander class light cruisers *Ajax* and *Achilles*, the latter being crewed by New Zealanders. The force was commanded by Commodore Harwood, who flew his flag in *Ajax*. During the engagement that followed the two light cruisers detached themselves from *Exeter*, and all three closed the enemy battleship at high speed, hoping to split her fire. While the *Graf Spee* concentrated her guns on the *Exeter*, the *Ajax* and the *Achilles* got within 6 nautical miles of the enemy and engaged her with their 6-inch guns. After an hour the *Graf Spee* abandoned the action and headed towards the River Plate, pursued by *Ajax* and *Achilles*.

This plate, based on a photograph of the action, shows the scene at around 7.25am, with *Ajax* viewed from the after deck of *Achilles*. At this stage of the war all three of the British ships were painted in mid-grey, with no camouflage. The damaged *Graf Spee* can be seen in the distance, shadowed by the Fairey Seafox launched by *Ajax* before the battle began. Seconds later a salvo of 11-inch shells from *Graf Spee* would hit *Ajax* and knock out ‘X’ turret.





HMS *Orion*, pictured in August 1940, while attached to the Home Fleet and deployed on convoy escort duties. Her new tripod masts and air warning radar sets have now been fitted, as have splinter shields around her twin 4-inch AA guns.

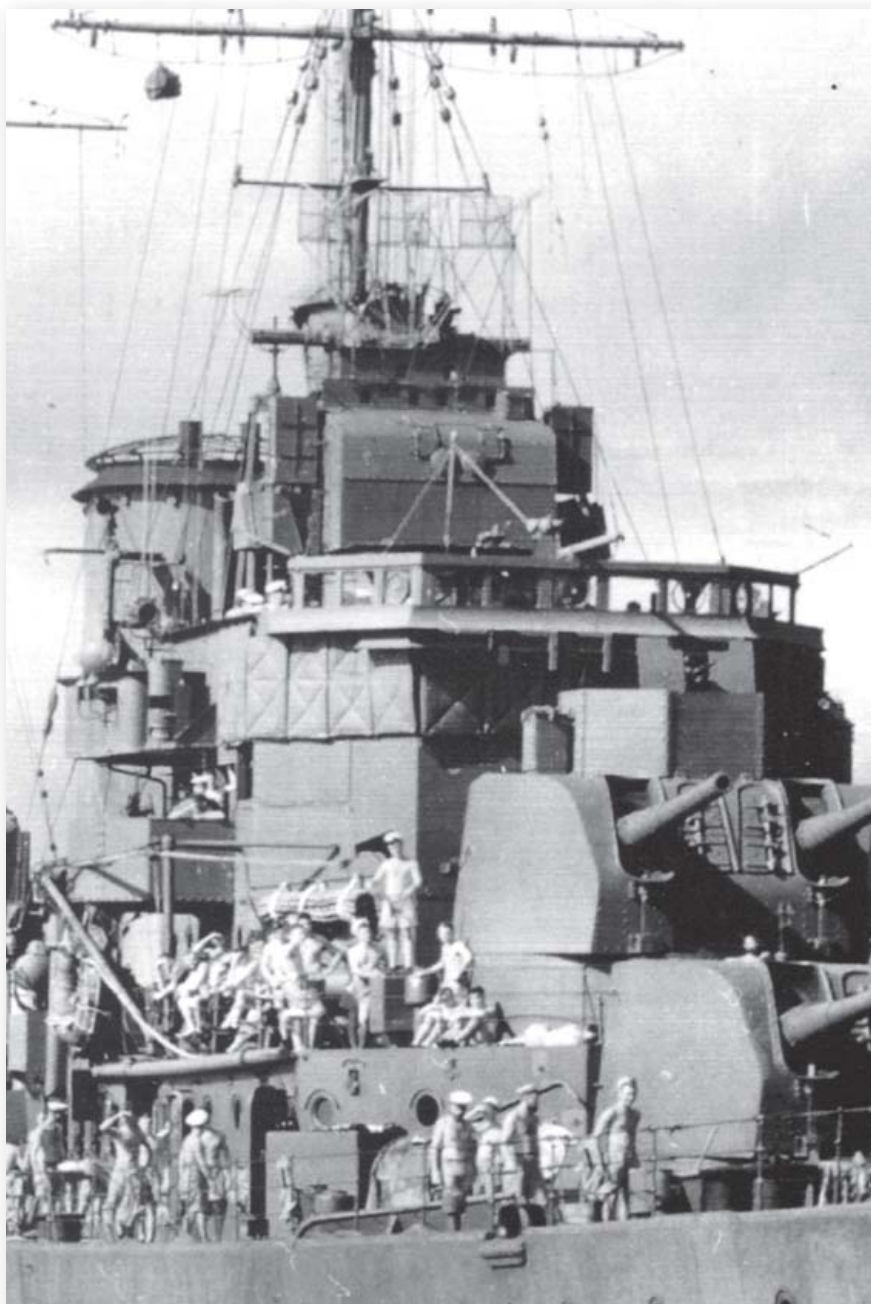
The first of these new Leander class cruisers, *Leander*, was laid down even before the treaty was signed, and three more (*Neptune*, *Orion* and *Achilles*) would follow during 1931. A fifth, *Ajax*, was laid down in 1933, after a delay imposed by budget constraints. By the time *Leander* was completed in March 1933 she had grown to displace over 7,150 tons. Her length, beam and the power of her engines had all been increased as she was being built, as a result of refinements to her original plans and the new demand of the Admiralty that these cruisers should be self-sufficient enough in terms of fuel and stores to operate in a trade protection role. This represented a major break from the older classes of 6-inch cruiser, which were essentially designed for use in the North Sea. These new ships were modern, versatile warships, and had to perform a wide variety of roles.

The Leander class cruiser HMS *Ajax*, pictured in October 1942 after she emerged from a refit in Chatham. By this stage of the war her original armament was augmented by two quadruple 2-pdr 'pom-poms', fitted at the expense of her aircraft catapult.

The five Leander class cruisers entered service during the early 1930s, and proved useful additions to the fleet. Their main armament was augmented by single 4-inch AA guns and machine guns, while they also carried 21-inch torpedoes mounted in two quadruple launchers, one on each beam. During the late 1930s all the ships apart from *Achilles* had their single 4-inch mounts replaced by twin mountings. They also carried an aircraft, mounted on its catapult, but there was no space for a hanger. By 1939 *Achilles* and *Leander* had been transferred to New Zealand, and had been modified to embark the Supermarine Walrus seaplane, while the other three cruisers carried the smaller Fairey Seafox.

During the war all of these vessels had additional light AA guns added to





A detailed view of *Leander* after her transfer to the New Zealand Navy. She never underwent a major refit, but her armament was augmented by additional single 20mm Oerlikons. This photograph was taken shortly before she was badly damaged at the battle of Kolombangara in July 1943.

them, and radar was added from 1940–41 onwards, the suites becoming increasingly expansive as the war progressed. *Neptune* was lost before any other modifications could be made, but during 1941 and 1943 the remaining four cruisers had their aircraft facilities removed, and additional light AA guns were mounted in their place. In 1942 *Achilles* lost her single 4-inch guns, which were replaced by 20mm AA guns. She also lost her 'X' turret in late 1943, and *Leander* had hers removed the following April. These small cruisers performed well during the war, but even before they entered service the Admiralty was designing larger and better-armed light cruisers, which made these Leander class vessels appear puny by comparison.

Vessel	Builder	Laid Down	Launched	Commissioned	Notes
<i>Leander</i>	Devonport Dockyard	September 1930	September 1931	March 1933	Broken up 1950
<i>Neptune</i>	Portsmouth Dockyard	September 1931	January 1933	February 1934	Sunk 19 December 1941
<i>Orion</i>	Devonport Dockyard	September 1931	November 1932	January 1934	Broken up 1949
<i>Achilles</i>	Cammell Laird, Birkenhead	June 1931	September 1932	October 1933	Sold to India 1948
<i>Ajax</i>	Vickers, Barrow-in-Furness	February 1933	March 1934	April 1935	Broken up 1949



The Arethusa class cruiser HMS *Aurora* as she appeared when she first entered service in November 1937. She was built without the aircraft catapult fitted to her sister ship, as she was intended to be a flagship, and the space was taken up with an additional deckhouse.

Arethusa Class

From 1929 onwards the Admiralty and the Director of Naval Construction (DNC) had been discussing the design of a new kind of cruiser, designed to support the main fleet. They were also similar to a class of three Perth class light cruisers being built for the Australian

Navy. By early 1932 the design of what would become the Arethusa class cruiser had been established – a 5,500-ton cruiser, carrying six 6-inch guns in three twin turrets. While this was one turret less than the Leander class cruiser, the decision to opt for a six-gun configuration was foisted on the Admiralty due to political and economic constraints. The Australian cruisers on which their design had been based were fitted with four twin 6-inch turrets. Secondary armament was set at four 4-inch AA guns, augmented by six 21-inch torpedoes, in two triple mounts. Three of these cruisers were also fitted with a catapult, mounted amidships, designed to carry a Hawker Osprey seaplane. *Aurora* never had a catapult, as she was designed as a flagship for a destroyer force – the space was taken up with deckhouse accommodation instead.

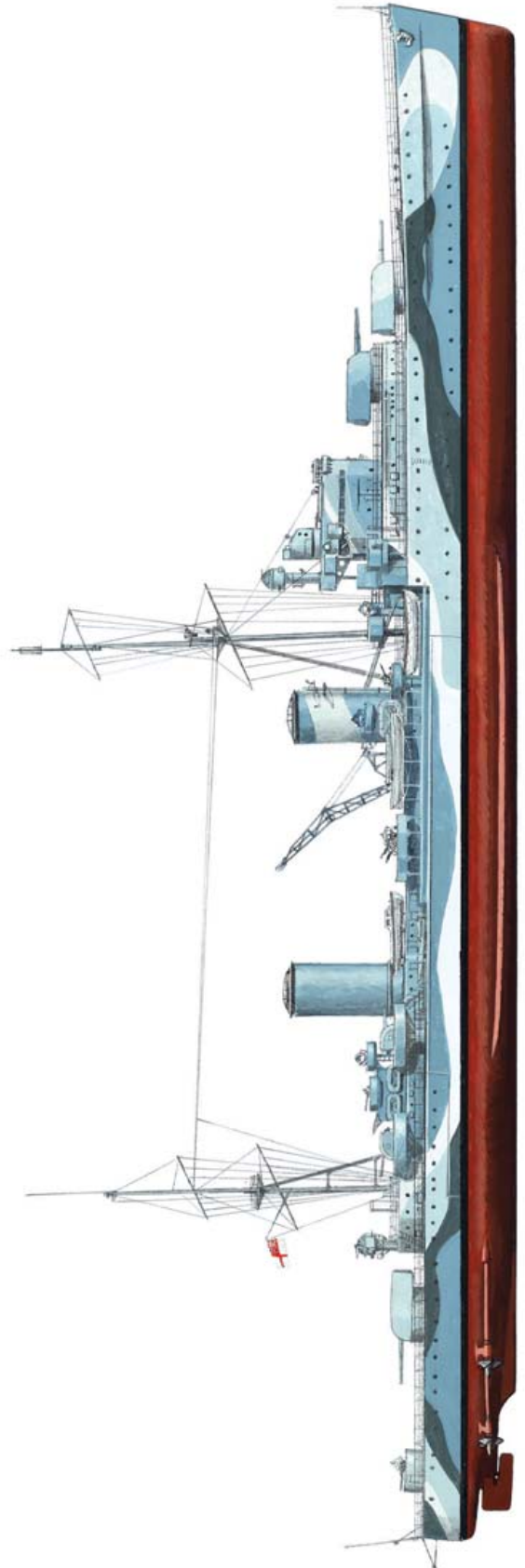
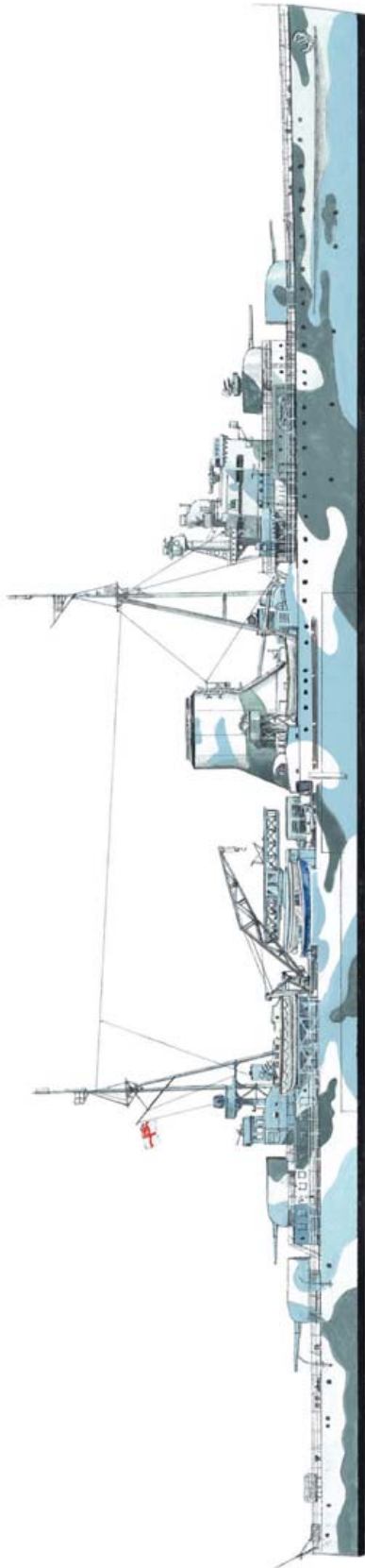
The four cruisers of the class – *Arethusa*, *Galatea*, *Penelope* and *Aurora* – entered service between 1935 and 1937. *Aurora* and *Arethusa* still retained their single 4-inch mounts in 1939, but by then the other two cruisers had had

C

HMS LEANDER (1940), HMS PENELOPE (1941)

The only single-funnel cruisers in the wartime navy, the six warships of the Leander class were built as a direct result of the naval disarmament treaty of 1930, and while deemed too small for trade protection, they were considered ideal for service with the fleet. HMS *Leander* (top) was the first of her class to enter service, and by 1940 she was on loan to the New Zealand Division, operating in the Indian Ocean and South Pacific, escorting convoys and hunting for German raiders. At this stage she still retained her catapult, designed to carry a Supermarine Walrus seaplane. Other cruisers of her class were fitted with smaller catapults, designed for use with the Fairey Seafox. This camouflage scheme was adopted by the New Zealanders for use in Pacific waters.

HMS *Penelope* (bottom) was one of the four light cruisers of the Arethusa class, which entered service between 1935 and 1937. Due to political considerations, the original design for an eight-gun cruiser was abandoned in favour of this six-gun configuration. As a result the cruisers of this class were poorly armed compared with later British light cruisers, but they still proved valuable assets, particularly in the Mediterranean, where they saw extensive action. During an extensive refit in 1940–41 *Penelope* lost her catapult and aircraft, and two quadruple 2-pdr 'pom-poms' were mounted in their place. This shows her as she appeared in October 1941, when she was transferred to the Mediterranean Fleet.





their single mounts replaced by twin turrets. *Arethusa* upgraded to twin mountings in 1942. The cruisers also lost their aircraft facilities in 1940–41, but all four cruisers benefited from the fitting of additional light AA guns and radar, although when *Galatea* was sunk in 1941 she only carried a Type 279 air warning radar. The other three cruisers were given more extensive radar suites during their various wartime

The Southampton class cruiser HMS *Gloucester*, pictured shortly before the outbreak of war. In September 1939 she was in the Red Sea, and remained in the Indian Ocean until April 1940, when she joined the Mediterranean Fleet.

refits. Given their poor armament, these cruisers all gave good service in the Home and Mediterranean fleets, although two were sunk during the war and the others suffered debilitating damage from enemy bombs, torpedoes or mines.

Vessel	Builder	Laid Down	Launched	Commissioned	Notes
<i>Arethusa</i>	Chatham Dockyard	January 1933	March 1934	February 1935	Broken up 1950
<i>Galatea</i>	Scotts, Clydebank	June 1933	August 1934	September 1935	Sunk 15 December 1941
<i>Penelope</i>	Harland & Wolff, Belfast	May 1934	October 1935	November 1936	Sunk 18 February 1944
<i>Aurora</i>	Portsmouth Dockyard	July 1935	August 1936	November 1937	Sold to China 1948

HMS *Gloucester*, pictured in late 1939. Clearly visible in this view is her double hangar for her Walrus seaplanes, sited abreast of her forward funnel. This cruiser spent much of the war attached to the Mediterranean Fleet.

Southampton Class

While the British Admiralty had been constrained by party politics, budget limitations and the terms of the Washington and London treaties, its Japanese counterparts suffered fewer restrictions, and were more willing to bend the rules of the treaties if it suited them. The Mogami class ships that began entering service in 1935 carried 15 6.1-inch guns in five triple turrets, but they were still classed as light cruisers. The Japanese were also building powerful heavy cruisers in greater numbers than the treaty limits allowed. The US Navy, although it suffered the same type of limitations as the British, was in the process of commissioning its first post-treaty light cruisers – the Brooklyn class – whose ships also carried 15 6-inch guns, mounted in triple turrets. Britain needed to follow suit, or be left behind.



The Director of Naval Ordnance (DNO) already had a blueprint for a triple 6-inch turret, which had been designed in 1932. In its 1933 budget the Admiralty had already approved the funds to build four more light cruisers, two Leander class and two *Arethusa* class ships. The decision was made to build three larger vessels instead, each displacing around 8,000 tons, and carrying four of



these new triple turrets. Various designs were considered by the DNC, and by late 1934 one of them was approved by the Admiralty. The result was the Southampton class of light cruiser – a class that marked a radical change in British cruiser design. As all the vessels were named after British towns, they are sometimes unofficially referred to as the Town class.

The Southampton class light cruiser was designed to be used in support of the fleet and in a trade protection role. This meant that the ships enjoyed sufficient armour to protect their vitals against 6-inch shell hits and had the firepower needed to hold their own against any other cruiser afloat. Their fuel tanks also gave them a radius of 7,700 nautical miles, about 2,000 miles more than Britain's previous light cruisers. Two of these cruisers, *Southampton* and *Newcastle*, were laid down in 1934, paid from the 1933 budget, and three more followed for the next two years, *Birmingham*, *Glasgow* and *Sheffield* in 1935 and *Gloucester*, *Liverpool* and *Manchester* in 1936. The fire control systems varied slightly from batch to batch, but all of them carried 12 6-inch guns, mounted in the new Mark XII triple turret, backed by what was now becoming the standard secondary battery of eight 4-inch guns in four twin turrets, plus torpedoes and light AA guns. Each cruiser also carried a catapult and hangers capable of holding up to three Supermarine Walrus seaplanes.

The last three cruisers to be built – *Gloucester*, *Liverpool* and *Manchester* – received additional deck armour over their magazines and machinery spaces. This modification led to their engines being enhanced, in order to avoid the extra 1,400 tons of displacement reducing their speed. As a result this subgroup is sometimes portrayed as a separate class in its own right, the Gloucester class. In fact, the Admiralty made no such distinction. The only other pre-war modification made to these ships was the fitting of an experimental Type 79Y air warning radar in HMS *Sheffield* in 1938.

During the war *Gloucester* and *Southampton* remained unaltered, although the latter did gain an air warning radar in 1940. Both were sunk before they could be refitted. The remaining six ships of the class received additional light AA guns as the war progressed, the first appearing during 1941 and 1942 at the same time as the ships received a suite of air warning, surface search and fire control radars. *Manchester* was lost in 1942, but the remaining five cruisers all had their aircraft removed – *Newcastle* in late 1942, *Birmingham* in mid 1943, *Sheffield* in early 1944, and *Glasgow* and *Liverpool* in 1945. During late 1944 or early 1945 they also lost 'X' turret, which was removed and the

The Southampton class cruiser HMS *Glasgow*, pictured in late 1942 after a refit in New York where she received a new suite of radars and additional light AA guns. She spent much of the rest of the war in the Home Fleet.

HMS *Manchester*, a Southampton class cruiser, pictured in the white hull and buff funnel colours adopted by warships on the China station before the outbreak of the war. From late 1940 onwards she received additional light AA guns and a full suite of radar equipment.



D

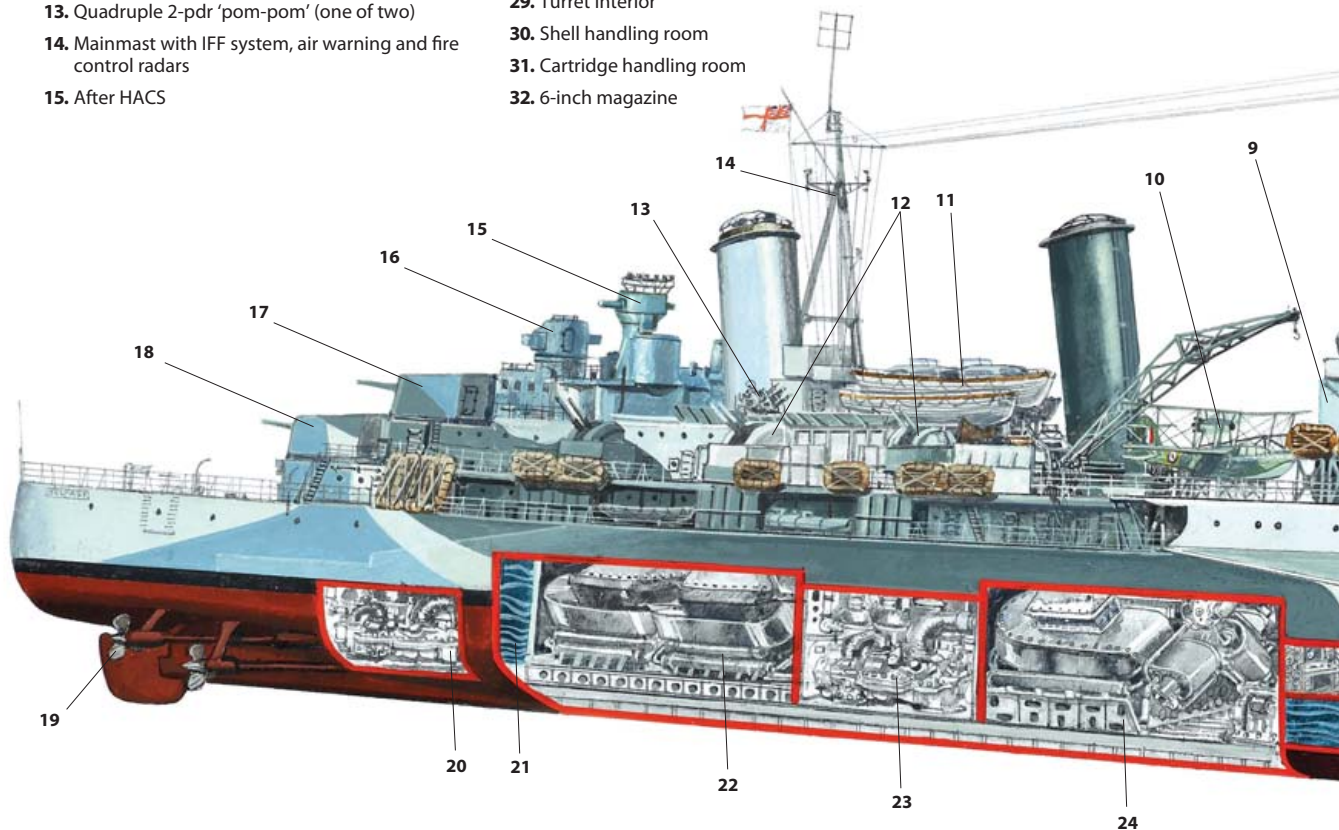
HMS BELFAST (1943)

The Edinburgh class light cruiser HMS *Belfast* is the only British light cruiser to have been preserved, and today she is moored as a floating museum in the River Thames in London. *Belfast* was built in the city she was named after and entered service just weeks before the outbreak of war. Like the cruisers of the Southampton and Fiji classes, *Belfast* and her sister ship *Edinburgh* carried 12 6-inch guns in four triple turrets, supported by a secondary battery of 4-inch AA guns, torpedo tubes, and light AA weapons.

Belfast was badly damaged by a mine in November 1939, and her repairs took just over three years to complete. She rejoined the Home Fleet, and in December 1943 she served as Burnett's flagship at the battle of North Cape. She also fired her 6-inch guns in anger off the Normandy beachhead. In this cutaway view she is painted in the camouflage scheme she carried in late 1943

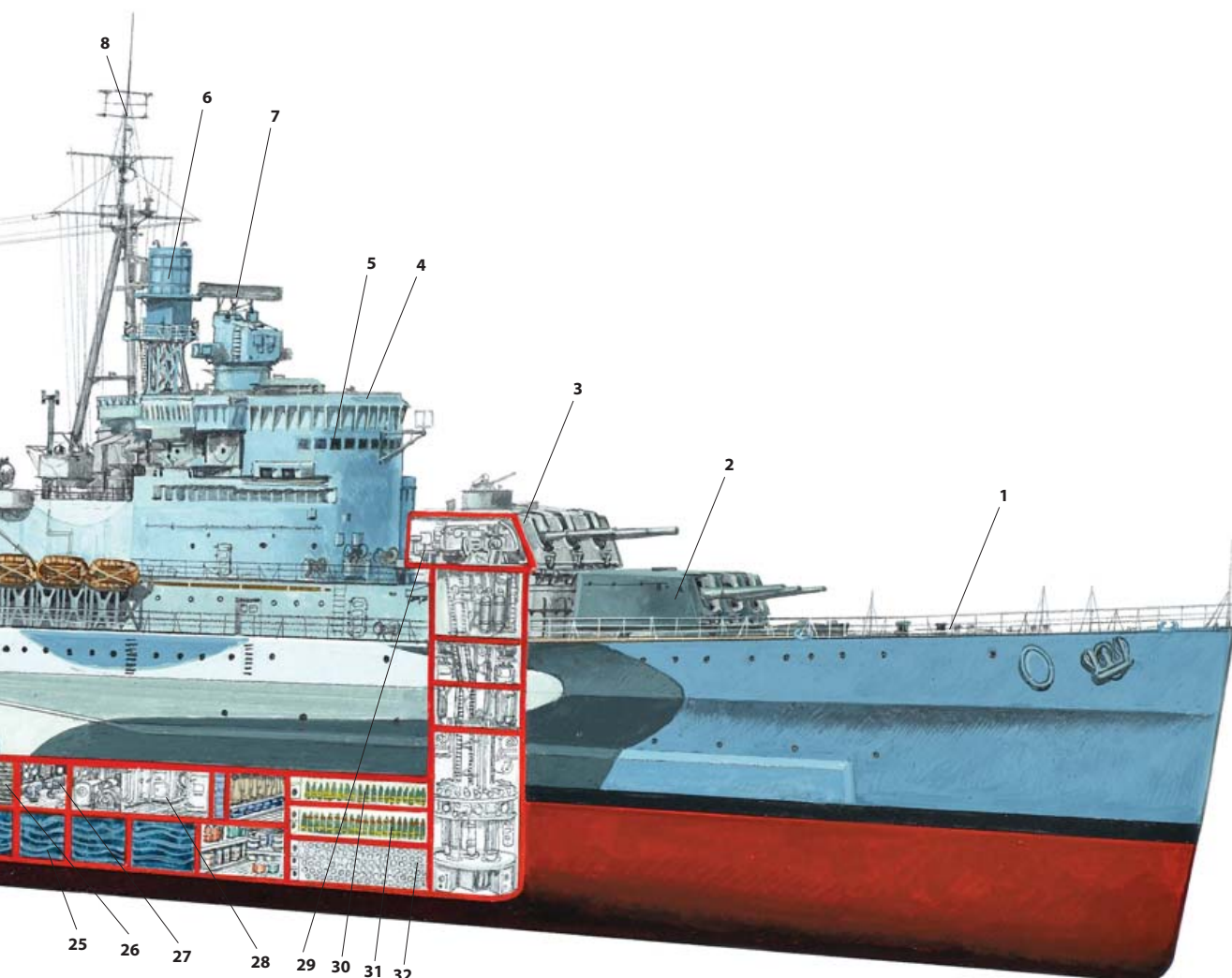
Key

- | | |
|---|---|
| 1. Forecastle | 16. After main gun director |
| 2. 'A' turret | 17. 'X' turret with 20mm Oerlikon mount |
| 3. 'B' turret with 20mm Oerlikon mount | 18. 'Y' turret |
| 4. Bridge | 19. Propeller (one of four) |
| 5. Admiral's bridge | 20. After turbine room |
| 6. Main gun director | 21. Fuel tanks |
| 7. High angle gun director | 22. After engine room |
| 8. Foremast, with surface search, air warning and fire control radars | 23. Forward turbine room |
| 9. Hangar | 24. Forward engine room |
| 10. Catapult and Supermarine Walrus seaplane | 25. Fuel tanks |
| 11. Boat deck | 26. Seamen's messdeck (one of several) |
| 12. 4-inch AA gun in twin mount (one of six) | 27. Washrooms (one of several) |
| 13. Quadruple 2-pdr 'pom-pom' (one of two) | 28. Galley and mess |
| 14. Mainmast with IFF system, air warning and fire control radars | 29. Turret interior |
| 15. After HACS | 30. Shell handling room |
| | 31. Cartridge handling room |
| | 32. 6-inch magazine |



HMS Belfast (as of December 1943)

Builders	Harland & Wolff, Belfast
Launched	17 March 1938
Commissioned	3 August 1939
Displacement	10,550 tons
Length overall	613 feet 6 inches
Beam	63 feet 4 inches
Draught	21 feet 3 inches
Propulsion	Four-shaft Parsons geared turbines, four Admiralty 3-drum boilers, producing 80,000 shp
Maximum speed	32.5 knots
Armament	Twelve 6-inch Mk XXIII in four triple mounts, twelve 4-inch Mk XVI in six double mounts, two eight-barrelled 2-pdr 'pom-poms', five twin 20mm, eight single 20mm
Torpedoes	Six 21-inch torpedoes in two triple mounts
Radar	Types 273 (surface search), 281 (air warning), 282 (local AA fire control), 283 (AA barrage fire control), 284 (main gun fire control), 285 (long range AA fire control)
Protection	Belt: 4½ inches, deck: 2 inches, over magazines: 3 inches, turrets: 2–4 inches
Aircraft	Three Supermarine Walrus seaplanes, one catapult
Complement	781



space filled with additional light AA guns, in preparation for deployment to the Pacific theatre. This class of light cruiser was considered extraordinarily successful and spawned three more classes of triple-turreted cruisers before the end of the war.

Vessel	Builder	Laid Down	Launched	Commissioned	Notes
<i>Southampton</i>	John Brown, Clydeside	November 1934	March 1936	March 1937	Sunk 11 January 1941
<i>Newcastle</i>	Vickers-Armstrong, Tyneside	October 1934	January 1936	March 1937	Broken up 1959
<i>Birmingham</i>	Devonport Dockyard	July 1935	September 1936	November 1937	Broken up 1960
<i>Glasgow</i>	Scotts, Clydeside	April 1935	June 1936	September 1937	Broken up 1958
<i>Sheffield</i>	Vickers-Armstrong, Tyneside	January 1935	July 1936	August 1937	Broken up 1967
<i>Liverpool</i>	Fairfield, Clydeside	February 1936	March 1937	November 1938	Broken up 1958
<i>Manchester</i>	Hawthorn Leslie, Tyneside	March 1936	April 1937	August 1938	Sunk 13 August 1942
<i>Gloucester</i>	Devonport Dockyard	September 1936	October 1937	January 1939	Sunk 22 May 1941

Edinburgh Class

By 1936 the Sheffield class was well under way, and the Admiralty had budgeted to build three more of these ships. For once, though, politics and diplomacy conspired to help rather than hinder the Admiralty. During 1935 a second London Naval Conference had been convened to update the limits of the previous two treaties. It was thought likely that a displacement cap of 9,000 tons would be placed on all new cruisers, so to forestall this the Admiralty drew up plans for an improved version of the last batch of Sheffield class cruisers, vessels carrying a similar armament but on a slightly larger hull, with more 4-inch guns and slightly better armoured protection. This in turn led to a larger displacement, so that the ship required a more powerful propulsion system in order to continue to match the 32-knot speed of the earlier cruiser class. The result was the Edinburgh class of two light cruisers – *Edinburgh* and *Belfast*.

Work began in December 1936 and these two cruisers entered service during the summer of 1939, the last British cruisers to do so before the outbreak of war on 3 September. During the war both cruisers proved

HMS *Edinburgh*, pictured shortly before the outbreak of war. After commissioning she was attached to the Home Fleet, based in Scapa Flow, and remained in northern waters for most of her career. She was torpedoed and sunk by a German U-Boat off Norway in April 1942.



extremely useful additions to the fleet and saw extensive service. *Edinburgh* was fitted with a Type 279 air warning radar in 1940, six 20mm light AA guns in 1942, and a suite of fire control radars for her main and secondary batteries in early 1942. She was torpedoed and sunk in May 1942 before any further modifications

could be made. *Belfast* struck a mine off the Firth of Forth in November 1940, and it was two years before she could rejoin the fleet. During that time she also received additional light AA guns, and a similar air warning and fire control radar suite to *Edinburgh*. Additional light AA guns were added during subsequent refits in 1943, 1944 and 1945, and her radars were also upgraded. *Belfast* survived the war and the decades of peace which followed, and she is now preserved as a museum ship, moored in the River Thames above Tower Bridge.



HMS *Belfast*, the famous sister ship of *Edinburgh*, photographed in December 1942 following her refit in Devonport. While her AA armament was augmented, the most useful addition to her fighting ability was the addition of an extensive new suite of radars.

Vessel	Builder	Laid Down	Launched	Commissioned	Notes
<i>Edinburgh</i>	Swan Hunter, Tyneside	December 1936	March 1938	August 1939	Sunk 2 May 1942
<i>Belfast</i>	Harland & Wolff, Belfast	December 1936	March 1938	August 1939	Preserved as a museum ship

Dido Class

Even before the outbreak of the war there was a growing appreciation of the threat posed by bomb- or torpedo-carrying aircraft. As the Admiralty embarked on a carrier-building programme it also considered ways of protecting these vulnerable ships from air attack. The solution was to build or convert light cruisers to provide anti-aircraft defence. As a stopgap several of the old C class cruisers were converted to fulfil this new role, but what the navy really needed were custom-built anti-aircraft cruisers. The DNC and the DNO decided to base their design around the semi-automatic 5.25-inch AA gun, and by the summer of 1936 plans for this new type of warship were completed. The result was the Dido class cruiser.

Ten ships of the class were ordered during the naval budget programmes of 1936–38. An additional one, *Argonaut*, followed in 1939. Construction began in 1937, and the first of these new vessels entered service during the summer of 1940. Unfortunately, shortages of the 5.25-inch Mark II turrets led to some of the completed ships entering

The Dido class cruiser HMS *Euryalus*, passing through the Suez Canal in November 1941 on her way to join the Mediterranean Fleet. At the time it was felt that taking the long sea route from Gibraltar to Alexandria by sailing around Africa was preferable to running the gauntlet of Axis air attacks in the central Mediterranean.





ABOVE

HMS *Cleopatra* as she appeared in early 1945, after extensive repairs in Philadelphia following her torpedoing off Sicily during Operation *Husky*. 'Q' turret (her third turret) was removed in Philadelphia, but her light AA armament was substantially increased.

RIGHT

HMS *Argonaut*, a Dido class cruiser, with her main battery of ten 5.25-inch dual-purpose guns trained to starboard. Although designed primarily as anti-aircraft cruisers, these versatile guns also proved useful in surface actions.



service without their full complement of ten guns in five twin mounts. Consequently *Bonaventure* had a single 4-inch gun mounted in her 'X' turret position, while *Dido* and *Phoebe* had the same type of stopgap gun mounted in place of 'Q' turret (directly in front of the bridge). *Scylla* and *Charybdis* entered service with eight 4.5-inch AA guns in four twin mounts. For the most part these ships retained their original main armament, although *Dido* was fitted with her 5.25-inch turret in late 1941 and *Phoebe* lost her 4-inch gun in 1942. She also temporarily lost 'A' turret during early 1943 due to damage, but it was replaced during the summer. All of the ships in the class received additional light AA guns and radars as the war progressed, although these modifications were minimal for *Bonaventure*, *Naiad* and *Hermione*, as they were lost during 1941 and 1942.

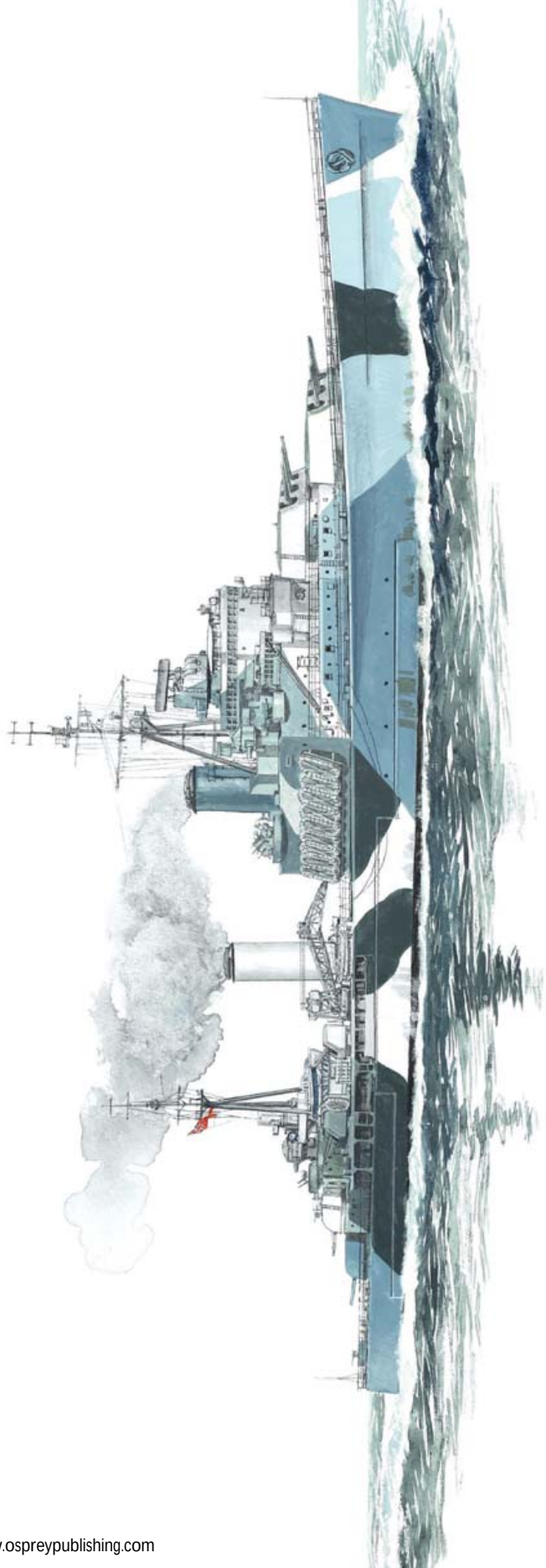
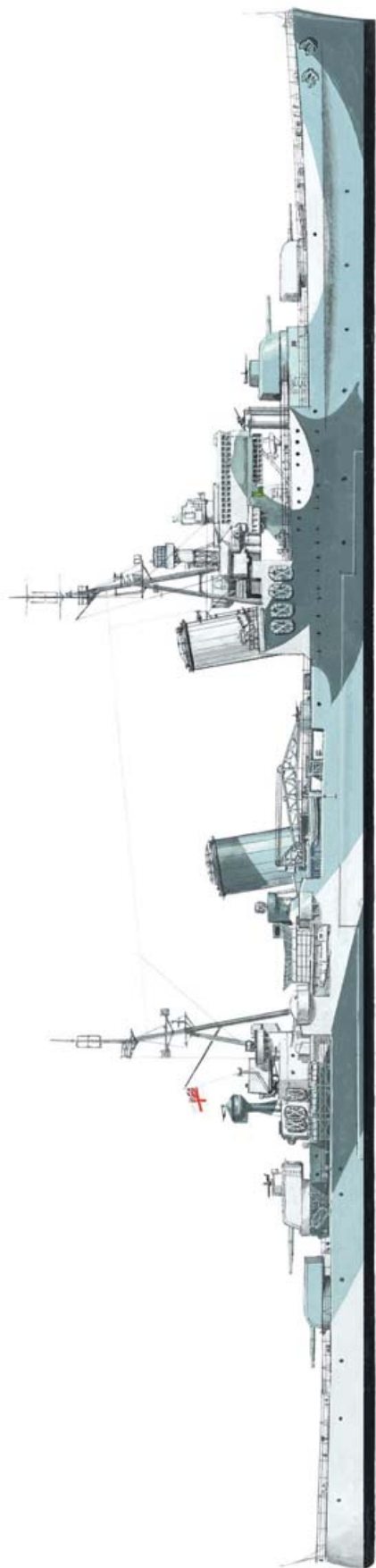
The Dido class ships were extremely useful vessels. They proved their worth during the Mediterranean campaign, when British ships were frequently subjected to gruelling air attacks, particularly during operations in support of

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HMS SHEFFIELD (1941), HMS GLOUCESTER (1941)

Probably the most famous light cruiser of the Southampton class, HMS *Sheffield* (top) saw extensive wartime service with the Home Fleet, as part of Force H based in Gibraltar and as part of the Mediterranean Fleet. Here she carries the camouflage scheme she wore in May 1941, when as part of Force H she took part in the hunt for the German battleship *Bismarck*. During this operation she was torpedoed by aircraft from another Force H ship, HMS *Ark Royal*. Fortunately the torpedoes failed to inflict any serious damage, although three of her crew were killed in the attack. At this stage she lacked any form of radar – the first of these was fitted during a refit in July 1941.

Her sister ship HMS *Gloucester* (bottom) joined the Mediterranean Fleet in May 1940, forming part of the 7th Cruiser Squadron based in Alexandria. She fought in the battle of Calabria (1940) and the battle of Matapan (1941), but in May 1941 she was bombed and sunk by German aircraft off Crete, and all but 82 of her 850-man crew were lost. Here she is painted in the 'Alexandria pattern' camouflage scheme she carried throughout the first five months of 1941.





Originally HMS *Bellona* and her four sister ships were meant to have been an extension of the Dido class, but wartime modifications to the design made them so noticeably different that they were grouped together into the Bellona class (or Modified Dido class).

Malta. It was discovered that these vessels were also very useful in a close-range naval engagement due to their multiple mounts and high rate of fire. The Dido class ships were therefore deemed a success, and were used extensively during the conflict.

Vessel	Builder	Laid Down	Launched	Commissioned	Notes
<i>Bonaventure</i>	Scotts, Clydeside	August 1937	April 1939	May 1940	Sunk 31 March 1941
<i>Naiad</i>	Hawthorn Leslie, Tyneside	August 1937	February 1939	July 1940	Sunk 11 March 1942
<i>Phoebe</i>	Fairfield, Clydeside	September 1937	March 1939	September 1940	Broken up 1956
<i>Dido</i>	Cammell Laird, Birkenhead	October 1937	July 1939	September 1940	Broken up 1958
<i>Euryalus</i>	Chatham Dockyard	October 1937	June 1939	June 1941	Broken up 1959
<i>Hermione</i>	Stephens, Clydeside	October 1937	May 1939	March 1941	Sunk 16 June 1942
<i>Sirius</i>	Portsmouth Dockyard	April 1938	September 1940	May 1942	Broken up 1956
<i>Cleopatra</i>	Hawthorn Leslie, Tyneside	January 1939	March 1940	December 1941	Broken up 1958
<i>Charybdis</i>	Cammell Laird, Birkenhead	November 1939	September 1940	November 1941	Sunk 23 October 1943
<i>Scylla</i>	Scotts, Clydebank	April 1939	July 1940	June 1942	Broken up 1950
<i>Argonaut</i>	Cammell Laird, Birkenhead	November 1939	September 1941	July 1942	Broken up 1955

Bellona Class

Six additional Dido class cruisers were authorized under the emergency naval budget programme of 1939, but work on these vessels was suspended in June



1940 as the threat of invasion led to shipyard resources being concentrated on completing existing warships, which might be needed to counter any German amphibious assault. Work was resumed in October, but only *Argonaut* was completed as planned as a Dido class vessel. The other five cruisers were modified in the light of lessons learned during the Norwegian campaign of April 1940. As a result, it was decided to omit 'Q' turret, leaving just 'A' and 'B' turrets in front of the bridge and 'X' and 'Y' turrets towards the stern. A quadruple 2-pdr 'pom-pom' was mounted in the 'Q' turret position and the bridge itself was moved forward to create more space amidships. Unlike the earlier vessels, the funnels of these new ships were perpendicular rather than raked, and additional light AA weapons were included in the final design.

The result is a type that was officially called the Bellona class, but is also sometimes referred to as the Modified Dido class, or even the Black Prince class. All but one of these new anti-aircraft cruisers entered service during the second half of 1943, with *Diadem* following the following January. All of them were designed as flagships, and carried an extra bridge, additional accommodation and offices. *Spartan* was lost to a German glider bomb off Anzio before she received any modifications, but her sister ships were all provided with additional light AA guns during the final year of the war.

The Fiji class cruiser HMS *Kenya* as she appeared in the spring of 1941, while serving with the Home Fleet based in Scapa Flow. Compared to the Southampton class these cruisers were considered cramped, as they were almost 40 feet shorter than the cruisers of the earlier class.

Vessel	Builder	Laid Down	Launched	Commissioned	Notes
<i>Spartan</i>	Vickers-Armstrong, Barrow-in-Furness	December 1939	August 1942	August 1943	Sunk 29 January 1944
<i>Bellona</i>	Fairfield, Clydebank	November 1939	September 1942	September 1943	Broken up 1959
<i>Black Prince</i>	Harland & Wolff, Belfast	December 1939	August 1942	November 1943	Sold to Japan 1962
<i>Royalist</i>	Scotts, Clydeside	March 1940	May 1942	September 1943	Sold to Japan 1968
<i>Diadem</i>	Hawthorn Leslie, Tyneside	December 1939	August 1942	January 1944	Sold to Pakistan 1956

The Fiji class cruiser HMS *Jamaica*, pictured in Scapa Flow in June 1943. That December she took part in the battle of North Cape, operating in consort with *Belfast* and *Sheffield*. This camouflage pattern was retained until late 1944.



Fiji Class

The Second London Naval Treaty was signed in March 1936, the signatories being Great Britain, the United States and France. Both Japan and Italy withdrew from the negotiations, and so weren't bound by its terms. By this time Germany was also becoming a rising naval power again, having disregarded the naval limits imposed on her by the Treaty of Versailles of 1919. The main effect of the treaty was that the powers that would soon form the Western Allies were imposing restrictions on themselves, but not on the powers that would soon become their enemies.

Under the terms of the treaty, cruiser displacement was limited to 8,000 tons with a maximum gun size of 6.1 inches. This meant there would be no repeats of the Southampton or Edinburgh classes, so for any future light cruisers the DNC had to find a way to incorporate the firepower and performance of these earlier vessels into a ship with a smaller displacement. Various configurations were considered, including vessels with multiple 5.25-inch guns, and quadruple turrets, which had recently been developed for the 14-inch guns of the King George V class battleship. Eventually the same gun configuration as the earlier 6-inch classes was selected and, to save weight, armoured protection was considerably reduced. The result was the Fiji class of light cruiser.

The hulls of these ships were shorter and narrower than their predecessors of the Southampton class and they had a squared-off transom stern compared to the rounded stern of the earlier cruisers. To save weight even further, no torpedo tubes or quadruple 2-pdr 'pom-poms' were fitted, although space was left for them to be added. Similarly, only one main battery Director Control Tower (DCT) was fitted aft, matched by a HACS director mounted above the bridge that was used to control anti-aircraft fire. The only area where

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HMS CLEOPATRA AT THE SECOND BATTLE OF SIRTE, 1942

In March 1942 the Dido class anti-aircraft cruiser HMS *Cleopatra* served as the flagship of Rear-Admiral Vian, who was charged with escorting a convoy from Alexandria to Malta, passing through the enemy-controlled waters of the central Mediterranean. On 22 March Vian's escorts clashed with a powerful Italian surface group, which included a battleship and several cruisers. The most powerful warships at Vian's disposal were his flagship *Cleopatra* and three other light cruisers. Vian attacked the enemy, buying time for the convoy to evade the Italians. In the action that followed *Cleopatra* was badly damaged, but after 2½ hours of fighting the Italian fleet withdrew and the convoy continued its journey to Malta, although two of its four cargo ships were sunk by air attack before it reached port.

This scene shows HMS *Cleopatra* at the commencement of the battle, viewed from her sister ship *Euryalus*, and is based on a photograph of the action. She is making smoke to screen the movement of the convoy behind her, while salvos from the Italian light cruiser *Giovanni delle Bande Nere* fall astern of her. Her rear turrets are still trained aft covering the convoy, which was being subjected to air attacks at the time. Minutes later *Cleopatra*'s bridge was hit by a 6-inch shell, but she continued fighting until the enemy withdrew.





Another view of HMS *Jamaica*, taken after the end of the war and showing her as she looked after her final wartime refit in late 1944, when 'X' turret was removed and the space filled with two additional quadruple 2-pdr 'pom-poms'.

HMS *Orion* as she appeared in the spring of 1942, when she emerged from a refit in California. There the heavy damage suffered during the evacuation of Crete was repaired, and her defences were augmented by new radars and light AA guns. New single 20mm Oerlikon mountings can be seen on top of 'B' and 'X' turrets.



compromises were not made was in the armament and the propulsion systems, both of which were the equal of the earlier class. This in turn made the cruisers top heavy, a problem that had to be addressed during the war.

Five Fiji class cruisers were ordered in late 1937 – *Fiji*, *Kenya*, *Nigeria*, *Mauritius* and *Trinidad*. A batch of four more was ordered in March 1938 – *Ceylon*, *Gambia*, *Jamaica* and *Uganda* – followed by a batch of two additional ships in 1939 – *Bermuda* and *Newfoundland*. The second and third batches were laid down during 1938–39. When work began again the design of the cruisers was altered slightly, so these are sometimes referred to as a separate Uganda class or Modified Fiji class. Officially though, the Admiralty regarded them as Fijis.

By September 1939 only four of the first five cruisers had been launched, and creeping changes to the specification meant that the ships were all over weight. After the outbreak of war, treaty limits were no longer of any importance, and so the Admiralty added a larger aircraft catapult, the torpedo tubes and additional light AA guns to most of the ships as they were being fitted out. In the end the class displaced 8,500 tons. *Fiji* entered service in the early summer of 1940, and, although she was sunk a year later, by the end of 1941 three other

Fijis had joined the fleet. The rest would follow during 1942–43.

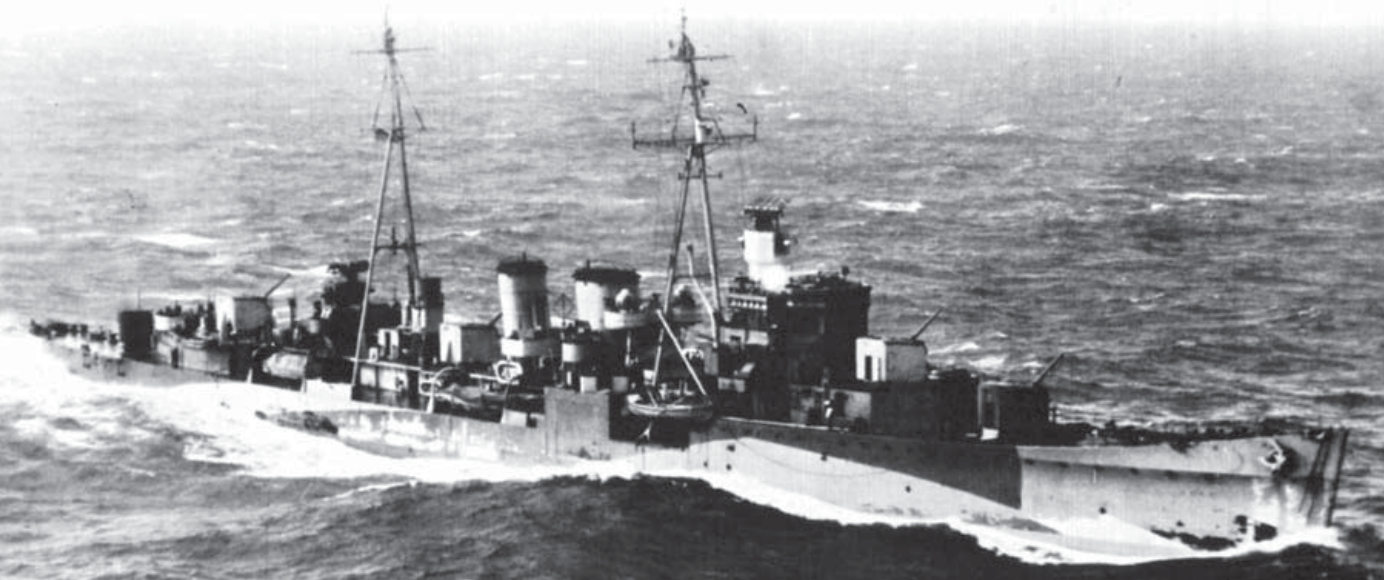
The problem with the Fiji class was stability. So much weaponry was carried on such a small hull that this was regarded as a serious problem. Captains were ordered to keep fuel in their tanks to serve as a counterweight, but there was no room for additional weaponry. If anything was added to one of these ships, then another piece of weaponry or equipment had to be landed to avoid adding too much top-hamper.



This problem had been partly redressed by the time the final batch of three cruisers entered service in early 1943. In *Uganda*, *Newfoundland* and *Ceylon*, 'X' turret was never fitted, and instead additional light AA guns were added. This drastic modification solved the top-hamper problem, and so in early 1945 *Kenya* and *Jamaica* also lost the same turret during refits. Otherwise all the cruisers of the Fiji class received additional light AA guns during the war and radar was also installed. At first this was usually limited to Type 273 (target indication) and Type 284 (main battery fire control), but during 1942–43 a more comprehensive radar suite was provided, including air warning and anti-aircraft fire control sets. Finally, during 1943–44 *Mauritius*, *Gambia* and *Jamaica* had their aircraft facilities removed in another attempt to save weight. Despite their stability problems, the Fiji class cruisers performed well and were used extensively as convoy escorts, in surface combat hunting groups, or in shore bombardment roles.

The Dido class cruiser HMS *Scylla*, pictured in Scapa Flow in June 1942, shortly after she was commissioned. Unlike their sister ships, *Scylla* and *Charybdis* were fitted with ten 4.5-inch AA guns in five twin turrets, rather than the larger 5.25-inch weapons carried by other Dido class vessels.

Vessel	Builder	Laid Down	Launched	Commissioned	Notes
<i>Fiji</i>	John Brown, Clydeside	March 1938	May 1939	May 1940	Sunk 22 May 1941
<i>Kenya</i>	Stephens, Clydeside	June 1938	August 1939	August 1940	Broken up 1962
<i>Nigeria</i>	Vickers-Armstrong, Tyneside	February 1938	July 1939	September 1940	Sold to India 1954
<i>Mauritius</i>	Swan Hunter, Tyneside	March 1938	July 1939	December 1941	Broken up 1965
<i>Trinidad</i>	Devonport Dockyard	April 1938	March 1940	October 1941	Sunk 15 May 1942
<i>Gambia</i>	Swan Hunter, Tyneside	July 1938	November 1940	February 1942	Broken up 1968
<i>Jamaica</i>	Vickers-Armstrong, Barrow-in-Furness	April 1938	November 1940	June 1942	Broken up 1960
<i>Bermuda</i>	John Brown, Clydeside	November 1938	September 1941	August 1942	Broken up 1965
<i>Uganda</i>	Vickers-Armstrong, Tyneside	July 1939	August 1941	January 1943	Transferred to Canada October 1944
<i>Newfoundland</i>	Swan Hunter, Tyneside	November 1939	December 1941	December 1943	Sold to Peru 1959
<i>Ceylon</i>	Stephens, Clydeside	April 1939	July 1942	July 1943	Sold to Peru 1959



The D class cruiser *HMS Delhi*, photographed while in transit in the English Channel in the spring of 1943, her five American 5-inch guns trained towards the enemy-occupied coast. These replacements for her original 6-inch guns proved effective, and were retained from 1942 onwards.

Swiftsure Class

It was always intended to build more Fiji class ships in programmes during 1941 and 1942, and three of each class were duly authorized. Two more orders would follow. However, these vessels were all heavily modified, either during the planning stage or after construction had begun, with the result that they formed a class all of their own, one that was notably different from their predecessors. The beam was increased to improve stability, and they were designed with only three triple turrets – ‘X’ turret being omitted. They outwardly resembled the last batch of Fijis to be built, but unlike the earlier cruisers they were never designed to carry aircraft.

These wartime cruisers were considered a low priority by the Admiralty, and only six ships were laid down during 1941–42, while one additional vessel (*Bellerophon*) was cancelled and another (*Hawke*) had her laying down delayed until the summer of 1944. She was eventually broken up on the slipway in 1946. Of the six remaining cruisers, only two would enter service before the end of the war, followed by one other in November 1945.

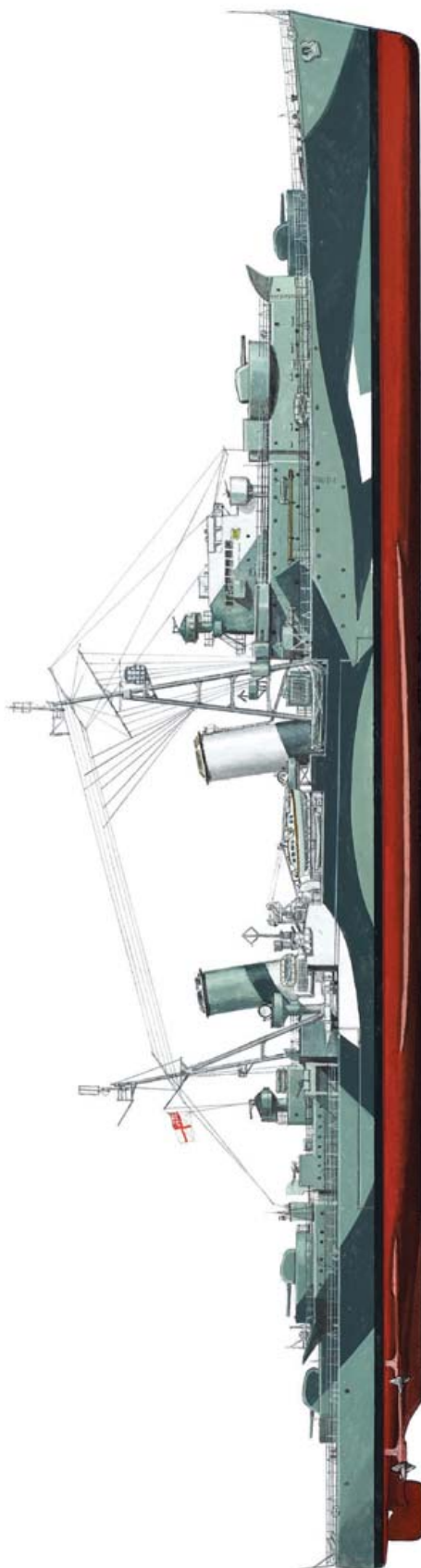
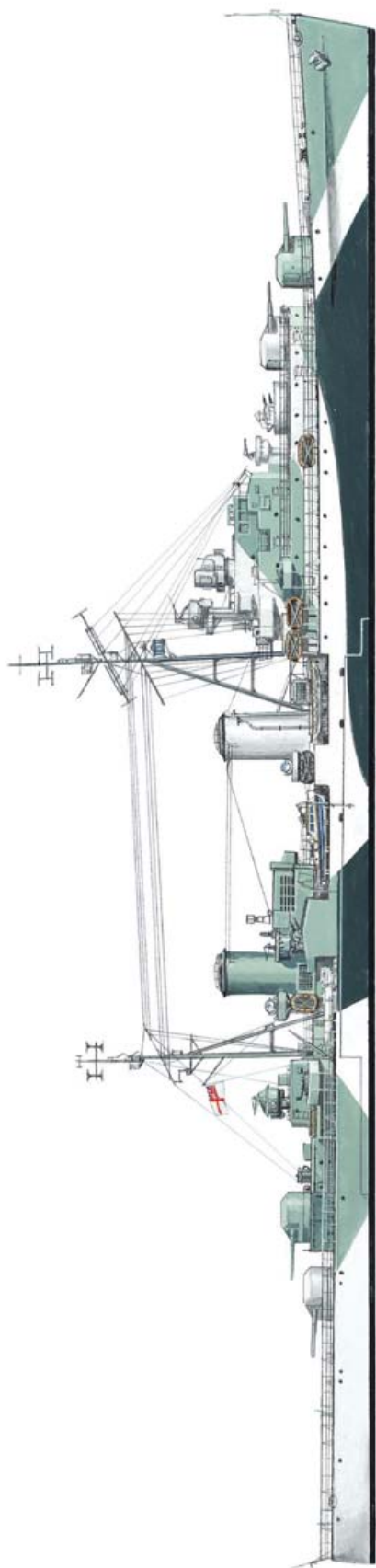
Three of these cruisers – *Swiftsure*, *Minotaur* and *Superb* – became known as the Swiftsure class (or Minotaur class). *Minotaur* was renamed the *Ontario* and transferred to the Canadian Navy before she was completed, but *Swiftsure* and *Superb* entered service before the end of 1945. While *Swiftsure* received

G

HMS BELLONA (1944), HMS EURYALUS (1944)

The first vessel and namesake of her class, *HMS Bellona* was a Bellona class (or Modified Dido class) anti-aircraft cruiser, which entered service in late 1943. The Dido class cruisers had stability problems, so it was decided that *Bellona* and her four sisters would only have four twin turrets – the space where ‘Q’ turret would have been was taken up by a quadruple 2-pdr ‘pom-pom’. *Bellona* served in the English Channel and with the Home Fleet, and took part in frequent sweeps in Norwegian waters, either as part of a surface group or as an escort to a carrier force. She is seen here in the camouflage scheme she wore during these late-war operations off Norway.

HMS Euryalus (bottom) was a Dido class anti-aircraft cruiser, designed around the semi-automatic 5.25-inch AA gun. With its automated loading system, this weapon had a high rate of fire, and when coupled with fire control radar this made these small cruisers powerful weapons, both as anti-aircraft escorts or in a close-range surface action. When she entered service in the summer of 1941, *Euryalus* carried ten of these guns in five twin turrets, but during a refit in 1943–44 ‘Q’ turret was removed to reduce weight, although her light AA armament was augmented by way of compensation and she received a new suite of radars. During 1944–45 she served with the Home Fleet before ending the war in the Far East.



additional light AA guns in August 1944 in preparation for redeployment to the Pacific, the war ended before she arrived there.

Three of the others (*Blake*, *Tiger* and *Defence* – the latter eventually renamed *Lion*) were mothballed as soon as they were launched. Work on them would only resume after 1959, when their design would be radically different. In this new configuration they would become the Tiger class – the last cruiser class in the Royal Navy. The last of them, *Blake* and *Tiger*, remained in service until 1978–79. As a midshipman, the author saw *Blake* in Gibraltar, months before she was decommissioned. She still looked magnificent even then.

Vessel	Builder	Laid Down	Launched	Commissioned	Notes
<i>Minotaur</i>	Harland & Wolff, Belfast	November 1941	July 1943	April 1945	Transferred to Canada, July 1944. Renamed <i>Ontario</i> 1944
<i>Swiftsure</i>	Vickers-Armstrong, Tyneside	November 1941	February 1943	June 1944	Broken up 1962
<i>Bellerophon</i>	Vickers-Armstrong, Tyneside				Cancelled 1946
<i>Blake</i>	Fairfield, Clydeside	August 1942	December 1945	Mothballed	Finally completed 1961
<i>Defence</i>	Scotts, Clydeside	June 1942	September 1944	Mothballed	Finally completed as <i>Lion</i> 1960
<i>Hawke</i>	Portsmouth Dockyard	August 1944			Broken up on slip, 1946
<i>Superb</i>	Swan Hunter, Tyneside	June 1942	August 1943	November 1945	Broken up 1960
<i>Tiger</i>	John Brown, Clydeside	October 1941	October 1945	Mothballed	Finally completed 1959

OPERATION

During the inter-war years Great Britain never really defined her naval policy in the event of another world war. For years such a conflict was deemed unthinkable, and so planning tended to be based around Britain's imperial needs, the requirements of her peacetime fleet, and the naval strategy and tactics that had evolved during War War I. During the 1930s the growing threat posed by Germany, Italy and Japan forced the Admiralty to define the cruiser's role in any future conflict. In theory they were the most flexible group of warships in the navy. Cruisers were fast, well-armed and could usually perform a range of naval roles. The heavy cruisers and Britain's older light cruisers were earmarked to fulfil the long-established role of protecting the sea lanes and hunting down enemy raiders. However, they could also be used to support the main battle fleet if required. While the light cruisers built during the 1930s could also fulfil this role of commerce protection, there was no clear pre-war definition of what the navy expected of them.

Traditionally cruisers had been used to scout for the enemy, but that job was now better left to aircraft. Light cruisers were also too valuable and unwieldy to use to hunt enemy U-Boats – that task was best left to destroyers and smaller escort vessels. As war approached the Admiralty felt that the greatest assets of its new light cruisers were their firepower, speed and manoeuvrability. This made them well suited to providing anti-aircraft



protection for convoys or task forces and for bombarding enemy coasts. They could also be used more aggressively to attack enemy surface forces or to raid their sea lanes. In the end this was exactly how Britain's light cruiser force was used. It escorted the Arctic and Malta convoys in the face of enemy air attacks, it bombarded enemy positions in support of landings in north-west Europe and the Mediterranean, and it fought its Italian and German counterparts in swirling surface actions, where the cruisers' combination of firepower and good fire control systems proved highly effective.

The E class cruiser HMS *Emerald* viewed in profile in Scapa Flow during the spring of 1943. At this time she carried a mixture of outdated single-mounted 6-inch guns, augmented by light AA guns, and a comprehensive radar suite.

Weaponry

For the most part Britain's wartime light cruisers were equipped with two types of ordnance; the 6-inch gun or the 5.25-inch gun. The move away from 8-inch guns came about as a result of the London Naval Treaty, and it also led to the abandonment of smaller calibre cruiser ordnance in favour of the 6-inch Mark XXIII Breech-Loader (BL) gun. In all, around 469 of these guns were produced, making them the most commonly used medium calibre breech-loading gun in the fleet. The first 6-inch breech-loaders had been introduced into the navy in 1879, and during World War I more modern versions of the weapon were used to provide secondary batteries in armoured cruisers and battleships, and as a main battery weapon in some smaller cruisers. The Mark XXIII was essentially a slightly modified version of these earlier weapons. It was therefore somewhat old-fashioned, as it was loaded manually and relied on a secondary bagged cordite charge, but it was reliable, accurate and effective.

The real difference between the 6-inch Mark XXIII and earlier 6-inch guns was its mounting. It was compact and well suited to being incorporated into a twin or triple turret. Designs for these turrets were approved by the DNO in 1930 and 1932 respectively, and these were duly incorporated into the design for the British Leander and Arethusa classes (using twin Mark XXI mountings), the Southampton class (with triple Mark XXII mounts), and finally the Edinburgh, Fiji and Swiftsure classes, which used triple Mark XXIII mountings.

The original intention was that these guns would be used to engage aircraft as well as surface targets, so that the guns would create a flak barrage to prevent enemy aircraft from approaching the fleet. The turrets were designed to permit very high gun elevation, but it was soon discovered that a combination of relatively slow rate of fire and turret rotation and training meant that the guns were unsuited for this role. However, as conventional guns they proved very effective, with a range of just over 24,000 yards (12 nautical miles). While these guns fired accurately, when the triple turret was first introduced into the Southampton class it was found that the fall of shot was too scattered. On investigation it was discovered that the shell from the central barrel was deflected slightly by the blast of the two outer guns. This problem was soon solved by setting the central barrel back slightly inside the turret and using an electrical circuit to delay firing by a second.

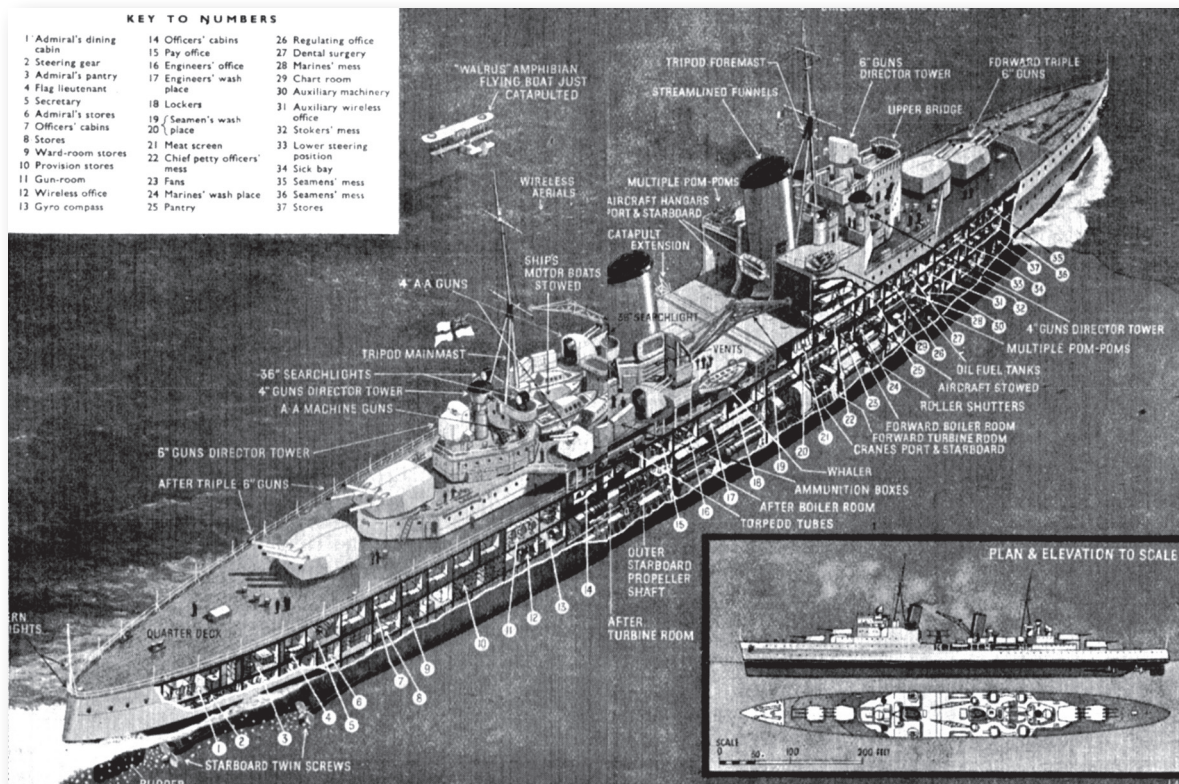
The big advantage of these guns in action came about as a result of their relatively old design. While guns with automatic or semi-automatic loading systems could only fire at their prescribed rate of fire, it was discovered that these manual-loading 6-inch guns could attain a much higher rate of fire for short periods, as the gun crews were able to outperform guns that relied on more automated forms of loading. British light cruiser crews could therefore increase their rate of fire considerably until the loading speed dropped again as the crews tired. This was often enough to give the British light cruisers an edge over their Italian opponents and their more modern semi-automatic guns and turrets. However, it was not possible at long range – over 10,000 yards (5 nautical miles) – as it took longer for the guns to elevate from their loading to their firing positions. At a range of 12,000 yards (6 nautical miles) these guns could penetrate 3 inches of belt armour, or 2 inches of deck armour at ranges over 20,000 yards (10 nautical miles). This made them more than a match for most Italian cruisers, heavy or light.

6-inch Breech-Loader Mk XXIII			
Calibre	6-inch	Rate of fire	Six rounds per minute (seven to ten rounds for brief period)
Date of design	1930	Weight of shell	112lb
Date first in service	1931	Shell types	High explosive, armour piercing
Length of bore	50 calibre (300-inch)	Weight of propellant charge	30lb ('supercharge')
Length of barrel	310 inches	Muzzle velocity	2,758fps
Weight of gun	6.9 tons	Maximum range	25,480 yards
Mounting	Twin Mark XXI Triple Mark XXII or Triple Mark XXIII	Ammunition storage per gun	Varies, depending on cruiser, but 250–300 rounds was typical
Maximum elevation	60 degrees Later reduced to (45°)	Estimated barrel life before replacement	1,100 rounds

Range and velocity (given for armour-piercing shells)				
Gun elevation	Range	Strike velocity (feet per second)	Angle of descent	Flight time
2.25°	5,000 yards	1,939fps	3°	7 seconds
6.25°	10,000 yards	1,371fps	10°	16 seconds
13°	15,000 yards	1,098fps	23.5°	30 seconds
39.5°	20,000 yards	1,087fps	40°	47 seconds
41°	25,000 yards	1,159fps	56.5°	72 seconds
41.5°	29,000 yards	1,240fps	79°	79 seconds

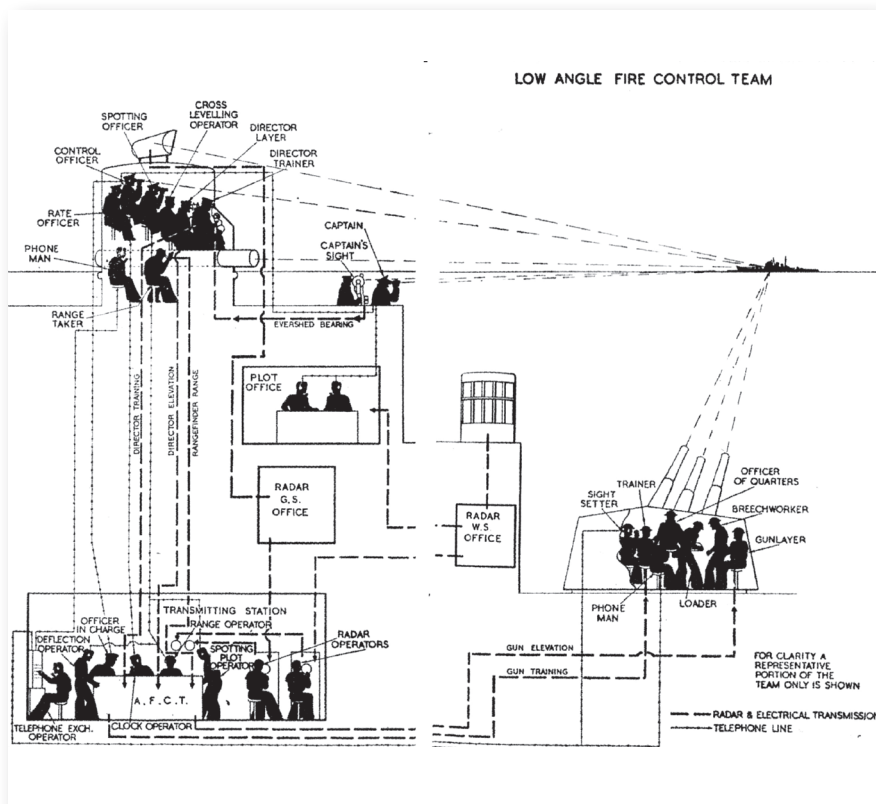
In the Dido and Bellona class anti-aircraft cruisers, the main gun was the 5.25-inch Quick-Firing (QF) gun, Mark I, the largest quick-firer in British wartime service. Exceptions were the Dido class cruisers *Scylla* and *Charybdis*, which were fitted with 4.5-inch QF guns instead. This was a dual-purpose gun, designed primarily as an anti-aircraft weapon, but which could also be used to engage surface targets if required. In these cruisers the guns were mounted in compact twin Mark II mounts, much smaller than the 6-inch turrets carried on other cruisers. These turrets usually performed well, but there seemed to be a problem with 'A' turret in the Dido class as the flexing of the flimsy bow sometimes jammed the turret. This happened in

KEY TO NUMBERS



ABOVE

A cutaway view of a Southampton class cruiser as she would have appeared during the opening year of the war, from a contemporary publication entitled *Britain's Glorious Navy*. While it shows the location of her HACS gunnery direction towers, this vessel lacks any of the radars or light AA guns that were fitted to warships of this class from 1940 onwards.



LEFT

The greatest advantage Royal Navy light cruisers enjoyed over their Axis opponents was radar-search, air warning and fire control sets being fitted from 1940 onwards. This diagram shows how visual and radar-guided fire control information is processed and used to direct the fire of the cruiser's main 6-inch battery.

April 1940, when the brand new *Bonaventure* was engaging the German heavy cruiser *Admiral Hipper* off the Norwegian coast. The problem was easily rectified by strengthening the bows of the Dido class.

The Norwegian campaign of April 1940 first demonstrated the true potential of these guns in surface actions. With a maximum range almost as good as that of the 6-inch gun and with the semi-automatic mounts providing a greater rate of fire, these ships were able to – and occasionally did – stand in the line of battle alongside 6-inch light cruisers during surface engagements with the Italian fleet. As the semi-armour-piercing (SAP) round could penetrate 3 inches of armour at 9,000 yards (4.5 nautical miles) this meant they had to get considerably closer than the 6-inch cruisers to inflict serious damage on enemy cruiser-sized vessels, but they could still more than hold their own in a close-range fight.

5.25-inch Breech-Loader Mk I			
Calibre	5.25-inch	Rate of fire	Seven rounds per minute
Date of design	1935	Weight of shell	80lb
Date first in service	1940	Shell types	High explosive, semi-armour piercing, starshell. From 1945 anti-radar
Length of bore	50 calibre (262.5-inch)	Weight of propellant charge	18lb ('supercharge')
Length of barrel	275.5 inches	Muzzle velocity	2,672fps
Weight of gun	4.3 tons	Maximum range	25,070 yards
Mounting	Twin Mark I Twin Mark II	Ammunition storage per gun	340 rounds
Maximum elevation	70 degrees	Estimated barrel life before replacement	750 rounds

In most wartime light cruisers from the Leander class onwards, the primary anti-aircraft weapon was the 4-inch Mark XVI QF gun, usually mounted in twin Mark XIX turrets. These turrets were HA/LA mounts, meaning they could fire at high and low angles against dive bombers and torpedo bombers respectively. Using the HACS director, these guns would put up a curtain of flak to deter enemy aircraft, and using Type 285 (fitted to most light cruisers after 1942–43), these could react quickly to counter incoming aircraft. They were even capable of shooting down attacking aircraft in their own right. *Carlisle*, carrying four of these mounts, shot down a total of 11 aircraft in the Mediterranean before she was almost destroyed off Greece in late 1943. In April 1940 she also used her 4-inch guns to sink a German transport ship off Norway, thereby demonstrating that *in extremis* these guns could be used against surface targets.

Just as effective were the lighter anti-aircraft weapons that were added to these light cruisers in increasing numbers as the war went on. Early war mounts such as single 2-pdrs, quad ½-inch machine guns and the cumbersome eight-barrelled 2-pdr 'pom-pom' were eventually replaced by more versatile quadruple 'pom-poms', single- and twin-mounted 20mm Oerlikons, then power-mounted versions. Finally, in some cases 40mm Bofors guns were added, either in single or quadruple mounts. Like the 4-inch guns, what made these light AA weapons more effective was the addition of radar fire control. Air search radars prepared the AA gunners for what was coming, and then sets like Type 282 and 285 helped feed information to the AA batteries during an air attack.

Less useful were the suite of torpedoes carried on board most light cruisers, and the aircraft with their attendant facilities. Both proved a liability in action as a hit on their position could cause an explosion or fires, and they were deployed with such infrequency that the ships were probably better off without them. As more fleet destroyers and aircraft carriers entered service the need for these weapons diminished, and so most were removed from the cruisers as the war progressed.



HMS *Edinburgh* as she appeared shortly before her loss in April 1942. She carried a new suite of surface search and fire control radars, fitted during a refit in Tyneside earlier that year. *Edinburgh* carried this striking camouflage pattern from October 1940.

Sensors and Fire Control

What really gave British light cruisers an edge over their wartime opponents was the highly effective combination of sensors and fire control they carried. While few cruisers had radar fitted before 1941, the number of sets proliferated, at least on ships that had survived the first gruelling naval campaigns of the war. In 1938, *Sheffield* was fitted with a Type 79 air warning radar, capable – if the conditions were right – of detecting enemy aircraft up to 60 miles away. If the enemy aircraft were Ju 87 Stukas, this gave the gunners 20 minutes advance warning of an air attack. The set then evolved into the versatile Type 279 radar, which combined its air warning function with a surface search capability.

There was a difference between ‘broad beam’ radar sets which were used for air and surface search – their effect likened to a floodlight – and ‘narrow beam’ sets, which were used to gather precise location and targeting information, like a torch or flashlight directed at the target. The Type 286 surface search radar and the Type 279 or Type 281 air warning sets fitted to many light cruisers during 1941 were both ‘broad beam’ sets, while the Type 284 main gun fire control radar was a ‘narrow beam’ radar.

Even before the advent of radar, British cruisers had well-tested visual fire control systems for use against surface or air targets. For instance, the HACS helped direct the cruiser’s main anti-aircraft guns (usually the 4-inch batteries) by calculating the height and bearing of incoming aircraft, and then passing this information on to the gun positions. This hydraulically driven system relied on visual targeting and worked well if the attacking aircraft maintained a constant course, altitude and speed. Unfortunately not all enemy aircraft were so obliging; for instance the system was particularly ineffective as a means of countering attacks by enemy dive bombers such as Stukas.

What gave the HACS a new lease of life was its integration with the Type 279 air warning radar, which allowed the operators to track every change of enemy course, speed and bearing. By late 1941 the light cruisers equipped with this radar had proved highly effective at countering enemy air attacks. *Fiji* was fitted with Type 279 radar, and in action off Crete in May 1941 she held off repeated enemy air attacks. She was finally bombed and sunk when her ammunition ran out.

By late 1941 the even better Type 285 radar began to be fitted to cruisers. Improvements continued until the end of hostilities. Secondary AA guns (or main batteries in the case of anti-aircraft cruisers) could also use the Type 283 radar and its attendant Auto Barrage Unit (ABU) to throw up heavy flak barrages in the path of incoming aircraft. This wall of flak proved just as deadly to aircraft as directly aimed AA fire. By 1943 radars such as the Type 282 were used to direct the fire of light AA guns, guided by directional antennas and automated precision ranging. The aim of all this electronic fire control was simple – it made sure the guns were pointing towards the oncoming

threat and were able to counter any manoeuvres the aircraft made while they were within range of the cruiser's guns.

Main gun batteries were provided with at least one Director Control Tower (DCT), but most of the larger light cruisers had two. They were trainable, and their crew tracked the enemy using stereoscopic rangefinders and passed information on the enemy's range, course, bearing and speed to the transmitting station (TS). There this information was rapidly analysed to produce a firing solution for the guns. The crew of the DCT also observed the fall of shot, and so corrected the aim of the guns until their shells were hitting the target.

This form of visual fire control was used by the light cruisers *Ajax* and *Achilles* during the battle of the River Plate. On the morning of 13 December 1939 they engaged the German pocket battleship *Graf Spee*, supported by the heavy cruiser *Exeter*. The way the battle was fought was similar to the naval engagements of World War I, as gun direction teams used magnified rangefinders to track the enemy and to direct the fire of the guns. During the battle *Ajax* and *Achilles* closed the range as quickly as they could to maximize the effectiveness of their 6-inch guns. While the *Graf Spee* concentrated her fire on *Exeter*, they forced the German battleship to split her fire and so probably saved *Exeter* from destruction. The light cruisers closed the range to less than 10,000 yards (5 nautical miles) and fired all they had at *Graf Spee*, including torpedo spreads. The German pocket battleship withdrew from the fight, and the British light cruisers shadowed her until she entered neutral waters off Montevideo.

Ajax was hit several times during the battle and her after turrets were hit and damaged. Her DCT was also damaged, but its surviving crew continued to feed targeting information to the guns using secondary rangefinders. *Achilles* fought much of the battle with her turrets under local control – individual spotters in each turret corrected their own shot. At such short ranges this less sophisticated system was probably just as effective, and more responsive. *Ajax* also launched her Fairey Seafox seaplane, which provided spotting information to the gunnery direction team during the battle by observing fall of shot. This was an old-fashioned battle, fought in a way that had changed little since the battle of Jutland.

This system of visual fire control was similar to those employed by Britain's enemies. What gave the Royal Navy an edge over its opponents was the integration of this already sophisticated system with radar. This could be used to augment visual gunnery control, and it also allowed the cruiser to fire 'blind' using radar fire control alone. The Germans, Italians and Japanese never reached anything like the same sophistication in radar fire control, and this advantage provided the British with a major advantage over their opponents. In 1941 the Type 284 main battery fire control began to be introduced into light cruisers, and the following year an improved version was developed that was more reliable, easier to operate and considerably more accurate. It could even detect shell splashes, and so could be used to 'walk' salvos onto the target.

Of course the real test of these fire control systems was whether they worked in action. During the battle of North Cape, fought in December 1943, Vice-Admiral Burnett's flagship *Belfast* and the cruisers *Sheffield* and *Norfolk* detected the German battlecruiser *Scharnhorst* as it tried to intercept an Allied convoy off the northern coast of Norway. At the time *Belfast* carried Type 273 target identification radar and Type 284 main battery fire control radar, as well as other air warning and secondary fire control sets. *Sheffield* and *Norfolk* carried a similar radar suite. At 9am on 26 December the cruisers detected *Scharnhorst* by radar and engaged her at a range of 6 nautical miles. The unsuspecting

German battlecruiser still had her guns trained fore and aft. She was hit twice, and her own primitive radar set was knocked out. She disengaged and the British cruisers shadowed her by radar, reporting her position to Admiral Fraser on board the battleship *Duke of York*. By early evening Fraser was in a position to engage *Scharnhorst*, supported by the cruiser *Jamaica* and Burnett's *Belfast*. The battle that followed was fought in a blizzard, but the British battleship and light cruisers used their fire control radars to track and engage the enemy. The *Scharnhorst* was eventually sunk – a victory that owed as much to the new technology of radar fire control as it did to British naval firepower. This engagement shows just how far British naval technology had come since 1939.

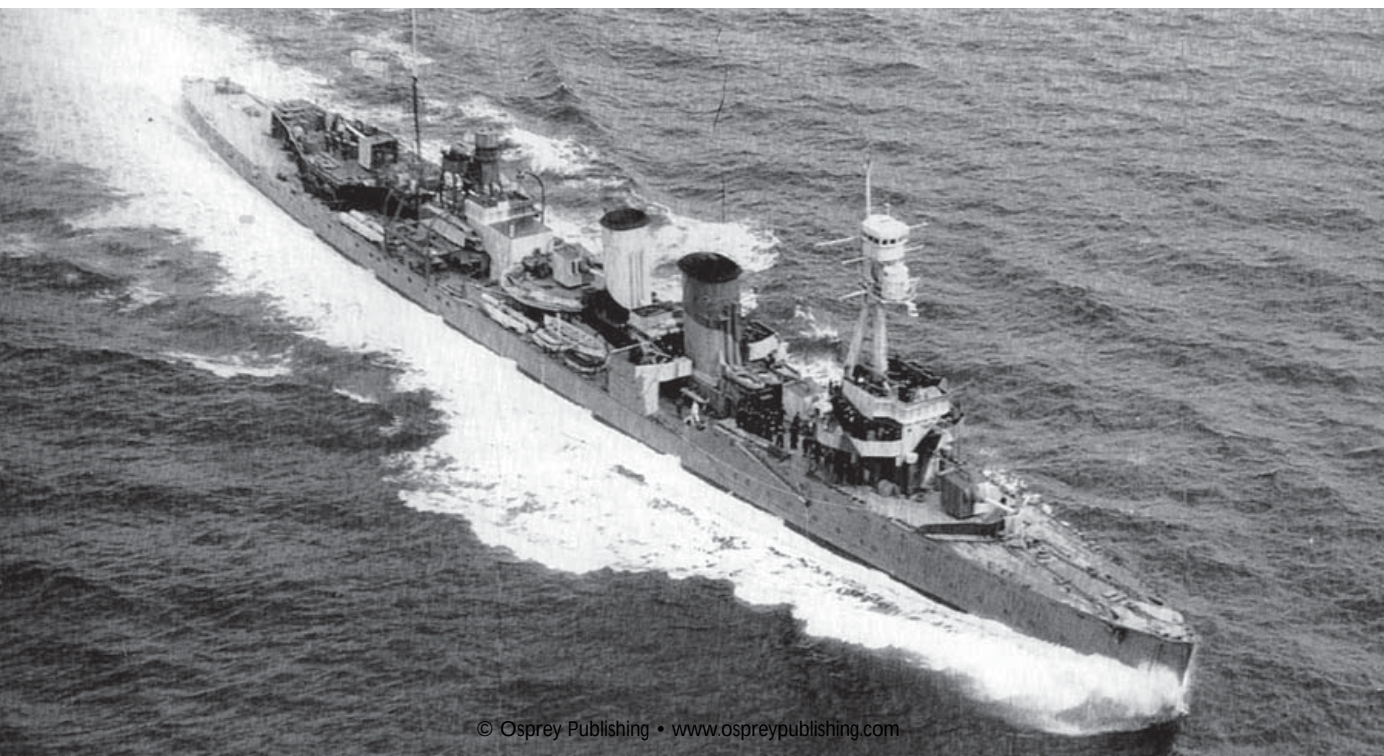
SPECIFICATIONS

Given for September 1939 or when first commissioned, whichever is later.

Caledon Class

Displacement	4,180 tons
Length overall	449 feet 10 inches
Beam	42 feet 9 inches
Draught	14 feet 3 inches
Propulsion	Two Parsons turbines, six Yarrow boilers, producing 40,000 shp
Maximum speed	29 knots
Armament	Five 6-inch Mk XII in single mounts, two 3-inch Mk I in single mounts, two 2-pdrs in single mounts
Torpedoes	Eight 21-inch torpedoes in quadruple mounts
Protection	Over machinery spaces: 3 inches, over magazine: 2¼ inches, deck: 1 inch
Aircraft	None
Complement	334

The Caledon class cruiser HMS *Caradoc* as she appeared in May 1943, while serving in the Indian Ocean. Unlike other C class cruisers apart from *Caledon*, the Caledon class cruisers were largely unmodified during the war. Apart from a few additional light AA guns, *Caradoc* still retained the profile she had when she was first commissioned during World War I.



Ceres and Carlisle Classes

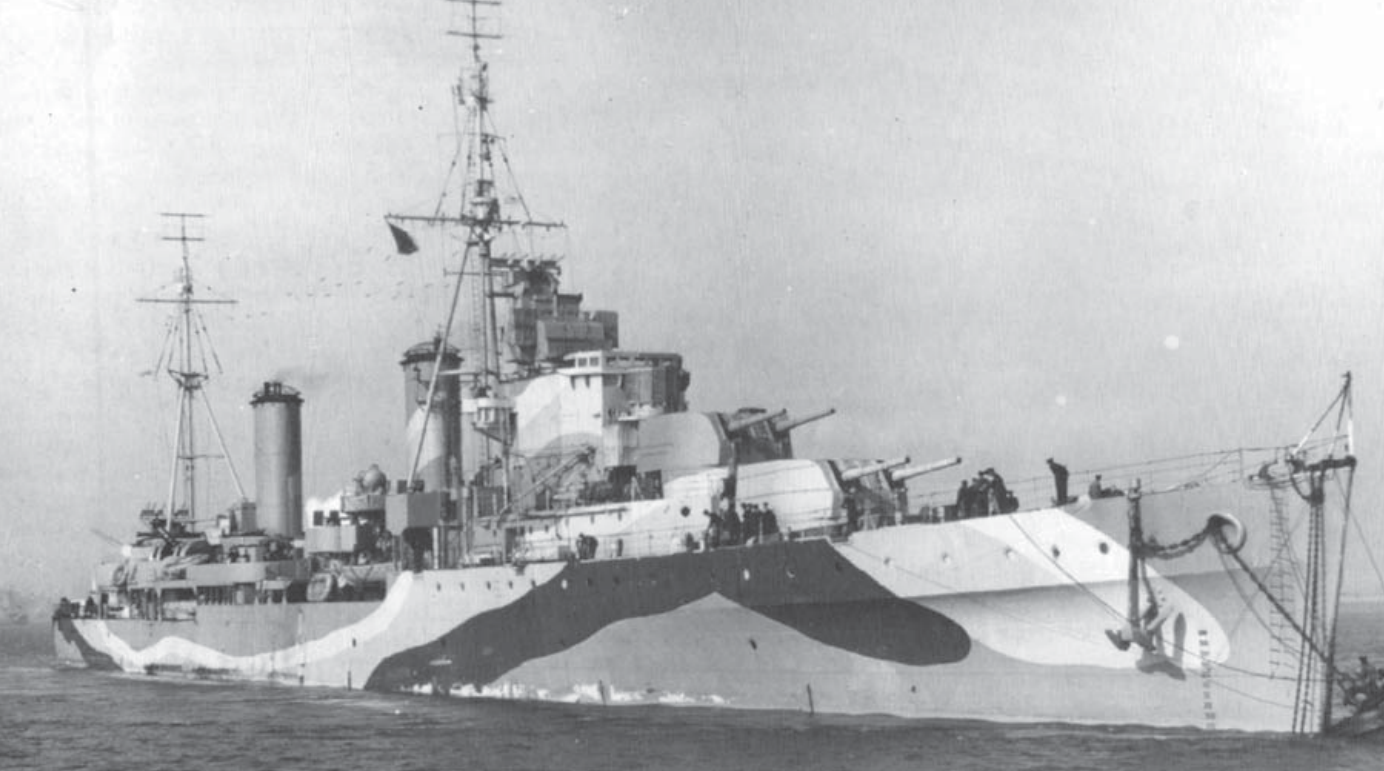
Displacement	4,290 tons (4,200 tons for Carlisle class)
Length overall	451 feet 6 inches
Beam	43 feet 6 inches
Draught	14 feet 3 inches
Propulsion	Two Parsons turbines (Brown-Curtis turbines in <i>Colombo</i> and <i>Carlisle</i>), six Yarrow boilers, producing 40,000 shp
Maximum speed	29.5 knots
Armament	<i>Cardiff, Ceres</i> : Five 6-inch Mk XII in single mounts, two 3-inch Mk I in single mounts, two 2-pdr in single mounts <i>Coventry, Curlew</i> : Ten 4-inch Mk V in single mounts, two eight-barrelled 2-pdr 'pom-poms' <i>Curacoa, Cairo, Carlisle, Calcutta</i> : Eight 4-inch Mk XIX in twin mounts, one quadruple 2-pdr 'pom-pom', two quad ½-inch machine guns (not <i>Curacoa</i>)
Torpedoes	Eight 21-inch torpedoes in two quadruple mountings (<i>Cardiff</i> and <i>Ceres</i> only)
Protection	Over machinery spaces: 3 inches, over magazine: 2¼ inches, deck: 1 inch
Aircraft	None
Complement	334

D Class

Displacement	4,850 tons
Length overall	472 feet 6 inches (471 feet for <i>Danae, Dauntless</i> and <i>Dragon</i>)
Beam	46 feet 6 inches (46 feet for <i>Danae, Dauntless</i> and <i>Dragon</i>)
Draught	14 feet 3 inches
Propulsion	Two Brown-Curtis turbines (Parsons turbines in <i>Dauntless</i> and <i>Diomedé</i>), six Yarrow boilers, producing 40,000 shp
Maximum speed	29 knots
Armament	Six 6-inch Mk XII in single mounts (four single, one double mount in <i>Diomedé</i>), three 4-inch Mk V in single mounts, two 2-pdrs in single mounts
Torpedoes	Twelve 21-inch torpedoes in four triple mounts
Protection	Over machinery spaces: 3 inches, over magazine: 2¼ inches, deck: 1 inch
Aircraft	None
Complement	452

HMNZS *Leander*, photographed in late 1942 after she was handed over to the New Zealand Navy in September 1941. At this time she was serving as a convoy escort in the South Pacific. She was returned to the Royal Navy in May 1944.





E Class

Displacement	7,550 tons (7,850 tons for <i>Emerald</i>)
Length overall	570 feet
Beam	54 feet 6 inches
Draught	16 feet 3 inches
Propulsion	Four Brown-Curtis, eight Yarrow boilers, producing 80,000 shp
Maximum speed	33 knots
Armament	Seven 6-inch Mk XII in single mounts (five single, one double mount in <i>Enterprise</i>), three 4-inch Mk V in single mounts, two 2-pdrs in single mounts
Torpedoes	Twelve 21-inch torpedoes in four triple mounts
Protection	Over machinery spaces: 3 inches, over magazine: 2¼ inches, sides in stern: 2 inches, deck: 1 inch
Aircraft	One
Complement	572

HMS *Arethusa* as she appeared in April 1942, after emerging from a major refit in Chatham. By this stage an extensive suite of radars had been added, and her catapult had been removed and replaced with a pair of quadruple 2-pdr 'pom-poms'.

Leander Class

Displacement	6,985 to 7,270 tons
Length overall	554 feet 6 inches
Beam	56 feet (55 feet for <i>Leander</i>)
Draught	19 feet
Propulsion	Two Parsons turbines, six Admiralty boilers, producing 72,000 shp
Maximum speed	32.5 knots
Armament	Eight 6-inch Mk XXIII in twin mounts, four 4-inch Mk V in single mounts, three quad ½-inch machine guns
Torpedoes	Eight 21-inch torpedoes in two quadruple mounts
Protection	Over machinery spaces: 3 inches, over magazine: 2 inches, sides in stern: 2 inches, deck: 1 inch, turrets: 1 inch
Aircraft	One
Complement	570

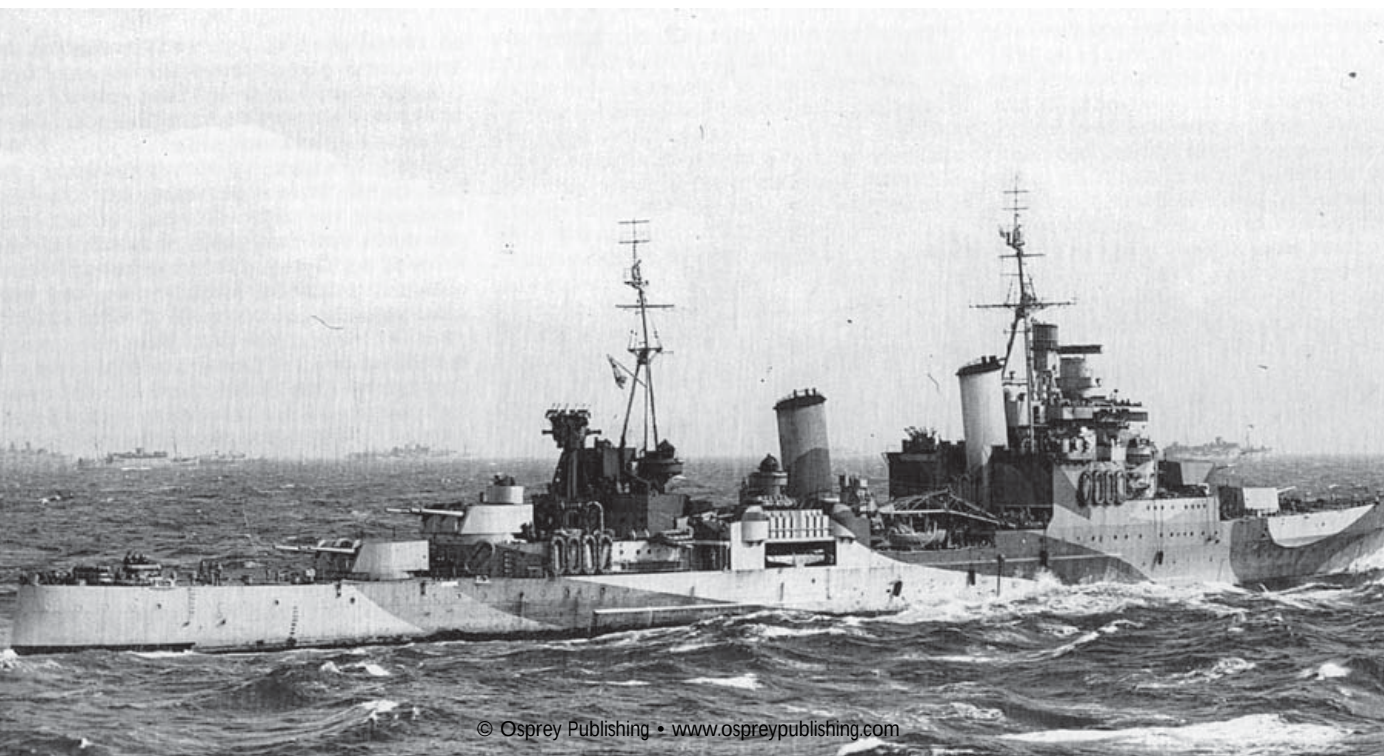
Arethusa Class

Displacement	5,220 to 5,270 tons
Length overall	506 feet
Beam	51 feet
Draught	16 feet 6 inches
Propulsion	Four Parsons turbines, four Admiralty boilers, producing 64,000 shp
Maximum speed	32 knots
Armament	Six 6-inch Mk XXIII in twin mounts, four 4-inch Mk V in single or double mounts (eight 4-inch in <i>Penelope</i> and <i>Aurora</i>)
Torpedoes	Six 21-inch torpedoes in three twin mounts
Protection	Over machinery spaces: 3 inches, over magazine: 2 inches, sides in stern: 2 inches, deck: 1 inch, turrets: 1 inch
Aircraft	One
Complement	570

Southampton Class

Displacement	9,100 tons (9,400 for <i>Liverpool</i> , <i>Manchester</i> and <i>Gloucester</i>)
Length overall	591 feet 6 inches
Beam	61 feet 8 inches (62 feet 4 inches for <i>Liverpool</i> , <i>Manchester</i> and <i>Gloucester</i>)
Draught	20 feet 4 inches (20 feet 7 inches for <i>Liverpool</i> , <i>Manchester</i> and <i>Gloucester</i>)
Propulsion	Four Parsons turbines, four Admiralty boilers, producing 75,000 shp (82,500 shp for <i>Liverpool</i> , <i>Manchester</i> and <i>Gloucester</i>)
Maximum speed	32 knots
Armament	Twelve 6-inch Mk XXIII in triple mounts, eight 4-inch Mk XVI in double mounts, two quadruple 2-pdr 'pom-poms', two quad ½-inch machine guns
Torpedoes	Six 21-inch torpedoes in two triple mounts
Protection	Belt: 4½ inches, deck: 1¼–2 inches, turrets: 1–2 inches
Aircraft	Up to three
Complement	748 (850 for <i>Liverpool</i> , <i>Manchester</i> and <i>Gloucester</i>)

The Southampton class cruiser HMS *Sheffield*, photographed in October 1942 while escorting the assault force for Operation *Torch* – the US landings in French-occupied North Africa. *Sheffield* then joined the Home Fleet and played an active part in Arctic convoy operations throughout 1943.



Edinburgh Class

Displacement	10,550 tons
Length overall	613 feet 6 inches
Beam	63 feet 4 inches (66 feet 4 inches for <i>Belfast</i> after 1942 refit)
Draught	21 feet 3 inches (23 feet 2 inches for <i>Belfast</i> after 1942 refit)
Propulsion	Four Parsons turbines, four Admiralty boilers, producing 80,000 shp
Maximum speed	32.5 knots
Armament	Twelve 6-inch Mk XXIII in triple mounts, twelve 4-inch Mk XVI in double mounts, two eight-barrelled 2-pdr 'pom-poms', two quad ½-inch machine guns
Torpedoes	Six 21-inch torpedoes in two triple mounts
Protection	Belt: 4½ inches, deck over magazines: 3 inches, over machinery spaces: 2 inches, turrets: 2–4 inches
Aircraft	Up to three
Complement	781

Dido Class

Displacement	5,600 tons
Length overall	512 feet
Beam	50 feet 6 inches
Draught	16 feet 6 inches
Propulsion	Four Parsons turbines, four Admiralty boilers, producing 62,000 shp
Maximum speed	32 knots
Armament	Varied, but standard fit was: ten 5.25-inch Mk I in twin mounts, two quadruple 2-pdr 'pom-poms', two quad ½-inch machine guns
Torpedoes	Six 21-inch torpedoes in two triple mounts
Protection	Belt: 3 inches, deck over magazines: 2 inches, over machinery spaces: 1 inch
Aircraft	None
Complement	487

Fiji Class

Displacement	8,530 tons
Length overall	555 feet 6 inches
Beam	52 feet (62 feet for <i>Uganda</i> , <i>Newfoundland</i> and <i>Ceylon</i>)
Draught	19 feet 10 inches
Propulsion	Four Parsons turbines, four Admiralty boilers, producing 80,000 shp
Maximum speed	32 knots
Armament	Twelve 6-inch Mk XXIII in triple mounts (nine in <i>Uganda</i> , <i>Newfoundland</i> and <i>Ceylon</i>), eight 4-inch Mk XVI in twin mounts, two quadruple 2-pdr 'pom-poms' (three in <i>Uganda</i> , <i>Newfoundland</i> and <i>Ceylon</i>), two quad ½-inch machine guns (not in <i>Uganda</i> , <i>Newfoundland</i> and <i>Ceylon</i>), 16–20 20mm in single or twin mounts (only in <i>Uganda</i> , <i>Newfoundland</i> and <i>Ceylon</i>)
Torpedoes	Six 21-inch torpedoes in two triple mounts
Protection	Belt: 3¼–3½ inches, deck: 2 inches, turrets: 2 inches
Aircraft	Up to three (two for <i>Uganda</i> , <i>Newfoundland</i> and <i>Ceylon</i>)
Complement	733



The Bellona class (or Modified Dido class) cruiser HMS *Diadem* was commissioned in January 1944 and served with the Home Fleet throughout the war. This photograph, taken in January 1945, shows her as she appeared shortly before an engagement with German destroyers off southern Norway.

Bellona Class

Displacement	5,950 tons
Length overall	512 feet
Beam	50 feet 6 inches
Draught	17 feet 9 inches
Propulsion	Four Parsons turbines, four Admiralty boilers, producing 62,000 shp
Maximum speed	32 knots
Armament	Eight 5.25-inch Mk I in twin mounts, three quadruple 2-pdr 'pom-poms', twelve 20mm in twin mounts
Torpedoes	Six 21-inch torpedoes in two triple mounts
Protection	Belt: 3 inches, deck over magazines: 2 inches, over machinery spaces: 1 inch
Aircraft	None
Complement	530

Swiftsure Class

Note: Specifications only provided for wartime cruisers – *Swiftsure* and *Superb*

Displacement	8,800 tons
Length overall	555 feet 6 inches
Beam	63 feet
Draught	20 feet 8 inches
Propulsion	Four Parsons turbines, four Admiralty boilers, producing 80,000 shp
Maximum speed	32 knots
Armament	Nine 6-inch Mk XXIII in triple mounts, ten 4-inch Mk XVI in twin mounts, four quadruple 2-pdr 'pom-poms', two quad ½-inch machine guns, 22 20mm in six single and eight twin mounts
Torpedoes	Six 21-inch torpedoes in two triple mounts
Protection	Belt: 3¼–3½ inches, deck: 2 inches, turrets: 2 inches
Aircraft	None
Complement	855

FURTHER READING

All the titles mentioned here are still available, either in bookshops or in good libraries. Many explore aspects of the subject in far more detail than has been possible in this book, and are therefore recommended as a source for further study.

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One of the drawbacks of British light cruisers compared to those of other nations was the persistence of the open bridge, seen here in the Southampton class cruiser HMS *Sheffield*. During the Arctic convoy operations this proved a distinctly uncomfortable place to be.

INDEX

Note: letters in **bold** refer to plates and illustrations.

anti-aircraft (AA) guns (RN) 7
 4-inch Mark XVI QF gun **D20–1**, 38
 4.5-inch QF gun 36–8
 5.25 inch Breech-Loader gun 23, 24, **24**, 28, 31, **G32**, 36, 38
 6-inch Mark XXIII Breech-Loader (BL) gun 35–8, 36
 20mm Oerlikon automatic cannon **15**, **D20–21**, 30, 38
 40mm Bofors gun 38
 quadruple QF 2-pdr ‘pom-pom’ 7, **A9**, **D20–21**, 27, 30, 38

battle of Calabria (1940) **E24–5**
 battle of Jutland (1916) 5, 6
 battle of Matapan (1941) **E24–5**
 battle of North Cape (December 1943) 40–1
 battle of the River Plate (December 1939) **B12–13**, 40
Bismarck, battleship (Germany) **E24–5**

conversions of cruisers 7, 7–8, 8, 10
 cruiser development 4–12, 28
 cruiser squadrons **B12**, **E24–5**

DCT (Director Control Tower battery) 28, 40
 displacement 7, 11, 12, 19, 22, 28
 DNC (Director of Naval Construction) 16, 19, 23, 28
 DNO (Director of Naval Ordnance) 18, 23, 35
Duke of York, HMS, battleship 41

Fairey Seafox reconnaissance plane (RN) **B12–13**, **C17**, 40
 fire control systems 7, 10, **11**, 19, **D20–1**, 31, **G32**, 37, 38, 39–41

Gloucester class 19
Graf Spee, battleship (German) **B12–13**, 40

HACS (High Angle Control System) 7, 11, 28, 37, 38, 39
 Hawkins class (heavy) cruisers 5, 10, 11, 12
 heavy cruisers (RN) 34
Exeter, HMS 12, **B12**, 40
Norfolk, HMS 40
York, HMS 12

light cruisers (RN)
 Arethusa class cruisers 18, 35, 44
Arethusa, HMS 16–18, 18, 43
Aurora, HMS 16, 16–18, 18
Galatea, HMS 16–18, 18
Penelope, HMS **C16–17**, 16–18, 18
 Bellona (Modified Dido) class cruisers 26–7, 27, 36, 46
Bellona, HMS 26, 27, **G32–33**
Black Prince, HMS 27
Diadem, HMS 27, 46

Royalist, HMS 27
Spartan, HMS 27, 27
 C-class cruisers
 Caledon class 41
Caledon, HMS 6, 6, 7, 41
Calypso, HMS 6, 6
Caradoc, HMS 6, 6, 41
 Calliope class 6
 Carlisle class 6, 7–8, 8, 10, 42
Cairo, HMS 7–8, 8
Calcutta, HMS 7–8, 8, **A8–9**
Capetown, HMS 7–8, 8
Carlisle, HMS 7–8, 8, 38
Colombo, HMS 7, 7–8, 8
 Caroline class 6
 Centaur class 6
 Ceres class 7, 42
Cardiff, HMS 6–7, 7
Ceres, HMS 6–7, 7
Coventry, HMS 6, 7, 7
Curacoa, HMS 7, 7
Curlew, HMS 7, 7, 8
 D-class cruisers 6, 8–10, 42
Danae, HMS **A8–9**, 10, 10
Dauntless, HMS 10, 10
Delhi, HMS 10, 10, 32
Despatch, HMS 10, 10
Diomedes, HMS 10, 10
Dragon, HMS 10
Dumedin, HMS 10, 10
Durban, HMS 10
 Dido class cruisers 23, 24–6, 26, 36, 45
Argonaut, HMS 23, 24, 26, 27
Bonaventure, HMS 24, 26, 38
Charybdis, HMS 24, 26, 31, 36
Cleopatra, HMS 24, 26, **F28–29**
Dido, HMS 24, 26
Euryalus, HMS 23, 26, **F28–9**, **G32–33**
Hermione, HMS 24, 26
Naiad, HMS 24, 26
Phoebe, HMS 24, 26
Scylla, HMS 24, 26, 31, 36
Sirius, HMS 26
 E-class cruisers 6, 43
Emerald, HMS 10–11, 11, 35
Enterprise, HMS 10–11, 11, 12
 Edinburgh class cruisers 35, 45
Belfast, HMS **D20–1**, 22–3, 23, 40–1
Edinburgh, HMS 22, 22–3, 23, 39
 Fiji class cruisers 28–31, 32, 35, 45
Bermuda, HMS 30
Ceylon, HMS 30, 31, 31
Fiji, HMS 30, 31, 39
Gambia, HMS 30, 31, 31
Jamaica, HMS 28, 30, 30, 31, 31, 41
Kenya, HMS 27, 30, 31
Mauritius, HMS 30, 31, 31
Newfoundland, HMS 30, 31, 31
Nigeria, HMS 30
Trinidad, HMS 30
Uganda, HMS 30, 31, 31
 Leander class cruisers 12–16, 18, 35, 38, 43

Achilles, HMS **B12–13**, 14, 15, **16**, 40
Ajax, HMS **B12–13**, 14, 14, 16, 40
Leander, HMS 4, 14, 15, 15, 16, **C16–17**, 42
Neptune, HMS 14, 15, 16
Orion, HMS 5, 14, 14, 16, 30
 Southampton (Town) class cruisers 18–19, 27, 35, 37, 44
Birmingham, HMS 19, 22
Glasgow, HMS 19, 19, 22
Gloucester, HMS 18, 19, 22, **E24–5**
Liverpool, HMS 19, 22
Manchester, HMS 19, 19, 22
Newcastle, HMS 19, 22
Sheffield, HMS 19, 22, **E24–5**, 39, 40, 44, 47
Southampton, HMS 18, 22
 Swiftsure (Minotaur) class cruisers 32, 35, 46
Bellerophon, HMS 32, 34
Blake, HMS 34, 34
Defence, HMS 34
Hawke, HMS 32, 34
Minotaur (Ontario), HMS 32, 34
Superb, HMS 32, 34
Swiftsure, HMS 32–4, 34
Tiger, HMS 34, 34
 Tiger class cruisers
Blake, HMS 34, 34
Defence (Lion), HMS 34, 34
Tiger, HMS 34, 34
 London Naval Treaty (1930) 4, 12, 35

mounting of BL guns 35, 38

naval policy 12, 23, 34

open bridge 5, 47

radar (RN) 19, 31, **G32**, 37, 38, 39–41
 air warning radar 5, 18, 19, 23, 39
 fire control radar 11, 31, 38, 39, 40
 target indication radar 31, 40
see also fire control systems
 role of cruisers 34–5

Scharnhorst, battlecruiser (Germany) 40–1
 Second battle of Sirte (1942) **F28–29**
 Second London Naval Treaty (1936) 22, 28
 specifications 41–6
 stability problems 30–1, 32, **G32**
 Supermarine Walrus, reconnaissance seaplane (RN) 4, 14, **C17**, 18

torpedoes 10, 39
 turrets 11–12, **D20–1**, 23–4, 27, 32, **G32–33**, 35, 36–8

Washington Naval Treaty 4, 5, 12
 weaponry 35–9
see also specifications
 World War I cruisers 6–11

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